U.S. Army Corps
of Engineers
Galveston District
Southwestern Division

Texas City Channel Deepening Project

General Reevaluation Report

and

Environmental Assessment

October 2007

Texas City Channel Deepening Project
General Reevaluation Report
And Environmental Assessment

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ACRONYMS

AEO - Annual Energy Outlook
AOI - Area of Impact
BCR – Benefit to Cost Ratio
CAA – Clean Air Act
CCC – Coastal Coordination Council
CERCLA – Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS – Comprehensive Environmental Response, Compensation and Liability Information System
CMSA – Consolidated Metropolitan Statistical Area
CWA – Clean Water Act
CY – cubic yards
dBA – A-weighted decibel
DMMP – Dredged Material Management Plan
DWT – dead weight ton
EA – Environmental Assessment
EFH – Essential Fish Habitat
EIA – Energy Information Administration
EIS – Environmental Impact Statement
EJ – Environmental Justice
EO – Executive Order
EPA – Environmental Protection Agency
ERDC – Engineer Research and Development Center
FINDS – Facility Index System
GBEP – Galveston Bay Estuary Program
GEN – Generator
GDM – General Design Memorandum
GIWW – Gulf Intracoastal Waterway
GMFMC – Gulf of Mexico Fishery Management Council
GNF – General Navigation Features
GRR – General Reevaluation Report
HGB – Houston Galveston Brazoria
H-GAC – Houston-Galveston Area Council
HQUSACE – Headquarters U.S. Army Corps of Engineers
HSC – Houston Ship Channel
LERR – Lands, easements, rights of way, relocations
LPG – Liquid Petroleum Gas
LPP – Locally Preferred Plan
LUST – Leaking Underground Storage Tank
mcy – million cubic yards
MLT – mean low tide
MSFCMA – Magnuson-Stevens Fishery Conservation and Management Act

MTP – Metropolitan Transportation Plan
NAAQS – National Ambient Air Quality Standard
NED – National Economic Development
NEPA – National Environmental Policy Act
NMFS – National Marine Fisheries Service
NOX – nitrogen oxides
NPDES – National Pollution Discharge Elimination System
NPL – National Priority List
NRHP – National Register of Historic Places
O&M – Operations and Maintenance
PA – placement area
PCA – Project Cost-Sharing Agreement
PHA – Port of Houston Authority
RCRA – Resource Conservation and Recovery Act
RCRA CORRACT – Resource Conservation and Recovery Act Corrective Action
RCRA TSD – Resource Conservation and Recovery Act Treatment, Storage and Disposal
SHPO – State Historic Preservation Officer
SIP – State Implementation Plan
SPPA – Shoal Point Placement Area
SWL – Solid Waste Landfill
TCEQ – Texas Commission on Environmental Quality
TCIT – Texas City International Terminals
TCMP – Texas Coastal Management Program
TIP – Transportation Improvement Plan
TPWD – Texas Parks and Wildlife Department
tpy – tons per year
TRIS – Toxic Release Inventory System
TSD – Treatment, Storage and Disposal
TSS – total suspended solids
TXDOT – Texas Department of Transportation
TxGLO – Texas General Land Office
TXRRC – Texas Railroad Commission
USACE – United States Army Corps of Engineers
USBOC – United States Bureau of Census
USCG – United States Coast Guard
USFWS – United States Fish and Wildlife Service
USGS - United States Geological Survey
VOC – volatile organic compounds
VTS – Vessel Traffic System
WRDA – Water Resources Development Act

EXECUTIVE SUMMARY

The Water Resources Development Act (WRDA) of 1986 authorized a 50-foot project depth for the Texas City Channel. The authorization provided for a 50-foot project depth from the offshore entrance channel through the Texas City inner harbor, but the project was put on hold in 1989 because the non-Federal sponsor was unable to secure construction funding. In a letter to the Galveston District U.S. Army Corps of Engineers (USACE) dated April 12, 2001, the non-Federal sponsor, the City of Texas City, requested reactivation of the Texas City Channel project. Their request was based on the emergence of the Shoal Point Container Terminal project and the Port of Texas City and the Texas City Channel users' renewed interest in deepening the Texas City Channel and existing turning basin to a depth of 45 feet. In correspondence dated November 12, 2002, the city of Texas City, the Port of Texas City, and the Texas City Channel users reaffirmed their support for the project and requested that USACE focus only on deepening the Texas City Channel project to a depth of 45-feet and maintaining the existing 400 feet width.

The Texas City Channel is a Federal deep-draft navigation project serving the Port of Texas City in Galveston County, Texas (Figure 1). It consists of a main channel connecting a turning basin at the port to the Gulf of Mexico through Bolivar roads, a part of the Houston Ship Channel (HSC). The main channel is 40 feet deep, 400 feet wide and about 6.8 miles long. The turning basin is 40 feet deep, 4,253 feet long, and ranges from 1,000 to 1,200 feet wide. An Industrial Canal, 40 feet deep and 300 to 400 feet wide extends 1.7 miles southwestward from the south end of the turning basin. The 40-foot channel was completed in June 1967.

The primary purpose of the deep-draft navigation project is to improve the navigational efficiency and safety of the existing waterway for movement of commerce and national security needs. An environmental opportunity also exists through the utilization of dredged material beneficially.

In April 2003 the City of Texas City (also the non-Federal Sponsor for the Federal Channel Deepening Project) received a Department of Army permit authorizing the construction of a six-berth marine container terminal including wharves, berthing areas, turning basin, and the deepening of the Texas City Channel to -45 feet MLT from the northern end of the turning basin to the intersection of the Texas City Channel and the Houston Ship Channel. The terminal facility would be constructed on approximately 400 acres of the active, leveed dredged material placement area known as Shoal Point, which is the primary placement area used for the placement of dredged material from the Texas City Channel. During the development of the Environmental Impact Statement (EIS) for the permit, a 50-year Dredged Material Management Plan (DMMP) was developed, not only to accommodate the dredged material from the berthing areas and the deepening of the channel, but to also include the maintenance material from the channel, including the existing turning basin.

The recommended Federal project plan for deepening the Texas City Channel and channel deepening portion of the permit for the container terminal are very similar. Both projects would deepen the channel from the current depth of 40 feet to 45 feet. No channel widening is expected, other than the incidental widening recommended for the Federal project for bend easing purposes. The primary difference between the permitted plan and the recommended Federal project is that the Federal project plan includes the deepening of the existing turning basin, while the permitted plan would dredge a new turning basin within the channel directly adjacent to the berthing areas. In addition, the Federal project would place two rock groins on the north side of the Texas City Dike (located on the northern side of the channel) to help slow sedimentation of material back into the main channel.

The DMMP that was developed for the EIS will accommodate dredged material not only from the berthing areas for the container terminal but also material from the deepening of the channel and future maintenance material from the channel, including the existing turning basin. The DMMP includes an environmental opportunity through the utilization of dredged material beneficially. Approximately 1,000 acres of emergent marsh would be created adjacent to the project, according to the DMMP.

During the reevaluation of the Federal project it was determined that the EIS developed for the container terminal permit contained applicable environmental material that related to the current recommended plan. The related information is incorporated into the General Revaluation Report (GRR) by reference. In addition, since the DMMP developed for the permit satisfies Federal project requirements, it was adopted for the current Federal project plan with minor modifications (Section 7.3).

Based on the economic, engineering and environmental factors considered, the selected plan includes deepening the Texas City Turning Basin and Texas City Channel from the Turning Basin to the channel junction with the HSC to -45 ft MLT. This is also the locally preferred plan. A total of approximately 4.8 mcy of construction and maintenance grade material would require separate dredging contracts to complete. The work is estimated to begin in 2008 and be complete by 2010.

The deepening and incidental widening of the Texas City Channel will generate annual benefits of $28,058,000 with annual costs of $3,309,000 producing a benefit-cost ratio of 8.5. The project benefits presented in this report are for a 50 year period of economic evaluation and are based on a Federal discount rate of 4.875 percent, and fiscal year 2005 vessel operating costs.

The project cost of all project components, minus inflation and interest during construction, totals $54,490,000. The total investment cost of all components totals $60,905,000, and includes $54,490,000 in project costs, $2,624,000 in interest during construction for project components, $2,683,000 in associated costs and $400,000 in cultural resources data recovery costs. Total average annual costs for the project are $3,272,000. The fully funded cost of the project, which includes project costs and expected escalation, totals $58,486,000. The Federal costs are $43,964,750 (75%) and non-Federal costs are $14,521,250 (25%).

The recommended navigation improvements are the locally preferred plan.

Texas City Channel Deepening Project
Final General Reevaluation Report
And
Environmental Assessment

1.0 STUDY INFORMATION

1.1 INTRODUCTION

The Water Resources Development Act (WRDA) of 1986 authorized a 50-foot project depth for the Texas City Channel. The authorization provided for a 50-foot project depth from the offshore entrance channel through the Texas City inner harbor. None of the 50-foot project features were constructed. The Non-Federal Sponsor's current interest is limited to a project depth of 45 feet. In a letter to the Galveston District U.S. Army Corps of Engineers (USACE) dated April 12, 2001, the Non-Federal Sponsor, the City of Texas City, requested reactivation of the Texas City Channel Project. Their request was based on the emergence of the Shoal Point Container Terminal Project and the Port of Texas City and the Texas City Channel users' renewed interest in deepening the Texas City Channel and existing turning basin to a depth of 45 feet. In correspondence dated November 12, 2002, the City of Texas City, the Port of Texas City, and the Texas City Channel users reaffirmed their support for the project and requested that USACE focus only on deepening the Texas City Channel project to a depth of 45-feet and maintaining the existing 400 feet width.

The project is located on the upper Texas coast extending from the Galveston Bay mainland shoreline at Texas City, through the jettied Galveston Entrance Channel, to deep water in the Gulf of Mexico. Galveston Bay is the largest estuarine system on the Texas coast and provides access to the principal ports of Houston, Texas City, and Galveston.

The Texas City Channel is a Federal deep-draft navigation project serving the Port of Texas City in Galveston County, Texas (Figure 1). It consists of a main channel connecting a turning basin at the port to the Gulf of Mexico through Bolivar roads, a part of the Houston Ship Channel (HSC). The main channel is 40 feet deep, 400 feet wide and about 6.8 miles long. The turning basin is 40 feet deep, 4,253 feet long, and ranges from 1,000 to 1,200 feet wide. An Industrial Canal, 40 feet deep and 300 to 400 feet wide extends 1.7 miles southwestward from the south end of the turning basin. The Texas City Channel is protected from cross currents and shoaling by the Texas City Dike, which consists of a pile dike 28,200 feet long, parallel to and north of the channel; and a rubble-mound dike, 27,600 feet long, along the southerly side of the pile dike. The 40-foot channel was completed in June 1967. Widening and realigning of the Texas City Turning Basin and enlargement through widening and deepening of the Industrial Canal and basins was initiated in July 1980 and completed in June 1982. The authorized work remaining is deferred construction consisting of widening the Industrial Canal from 250 feet to 300 feet at a 40-foot depth.

Figure Project area including the Texas City Channel, Turning Basin and Industrial Canal.

.2 PROJECT AUTHORITY

Section 201 of the Water Resources Development Act of 1986, Public Law 99-662, dated 17 November 1986, authorized the Texas City Channel 50-Foot project. The applicable portion of the Act reads as follows:

> *"The project for navigation, Galveston Bay Area, Texas City Channel, Texas: Report of the Chief of Engineers, dated March 11, 1986, at a total cost of $200,000,000, with an estimated first Federal cost of $130,000,000 and an estimated first non-Federal cost of $70,000,000."*

Work authorized, but not constructed, by WRDA 1986 included deepening the Texas City Turning Basin to 50 feet, enlarging the 6.7-mile long Texas City Channel to 50 feet by 600 feet, deepening the Bolivar Roads Channel and Inner Bar Channel to 50 feet, deepening the Outer Bar and Galveston Entrance Channels to 52 feet, and extending the Galveston Entrance Channel to a 52-foot depth for 4.1 miles at a width of 800 feet and an additional reach at a width of 600 feet to the 52- foot contour in the Gulf of Mexico. Establishment of 600 acres of wetland and development of water-oriented recreational facilities on a 90-acre enlargement of the Texas City Dike were also authorized but never constructed because the non-Federal sponsor, the City of Texas City was unable to secure funding to initiate plans and specifications in 1989. In recent years the size and draft of vessels using the Texas City channel have increased to meet the competitive demand for more efficient movements of bulk commodities, in particular crude petroleum and petroleum products. In 2001, the City requested deepening the channel to 45 feet to accommodate that demand. The City did not request deepening the channel to the authorized depth of 50 feet due to potential high project costs and environmental concerns.

The currently proposed project is less in scope than the authorized project. The total project cost that was authorized was $200,000,000.00. The Fully Funded project cost for the current proposal is $58,486,000. Therefore the Section 902 Cost Limit would not apply.

1.3 SHOAL POINT CONTAINER TERMINAL PERMIT

In April 2003 the City of Texas City received a USACE Permit authorizing the construction of a six-berth marine container terminal including utility lines, an access roadway, wharves, berthing areas, turning basin and the deepening of the Texas City Channel to -45 feet MLT from the northern end of the turning basin to the area known as the Texas City wye. The terminal facility would be constructed on approximately 400 acres of an active, leveed dredged material placement area (PA) known as Shoal Point, which is the primary PA used for the placing dredged material from the Texas City Channel. During the development of the Environmental Impact Statement (EIS) for the Permit, a 50-year Dredged Material Management Plan (DMMP) was developed, not only to accommodate the dredged material from the berthing areas and the deepening of the channel, but to also include the maintenance material from the channel, including the existing turning basin. Because 400 acres of disposal capacity will be utilized for construction of the terminal, the City of Texas City is required to replace that lost capacity. This will be accomplished by the City constructing a 357 acre area known in the permit as Beneficial Use Site (BUS) 1 (Figure 2). BUS1 will be referred to in this report as Shoal Point PA 1 (SPPA) 1.

1.4 PURPOSE AND SCOPE

The primary purpose of the Texas City Channel Deepening Project is to improve the navigational efficiency and safety of the existing waterway for movement of commerce and national security needs. An environmental opportunity also exists through the utilization of dredged material beneficially. Recreation demands and needs of the area may also be addressed by using dredged material to enlarge the beach areas north of the Texas City Dike.

This report presents the problems and opportunities, and expresses desired outcomes as planning objectives. Alternatives have been developed to address these objectives. These alternatives include a plan of no action and various combinations of structural and non-structural measures. The economic and environmental impacts of the alternatives were then evaluated and a feasible plan was selected.

The report also presents details on USACE and Non-Federal Sponsor participation needed to implement the plan. The report concludes with the identification of a recommended plan.

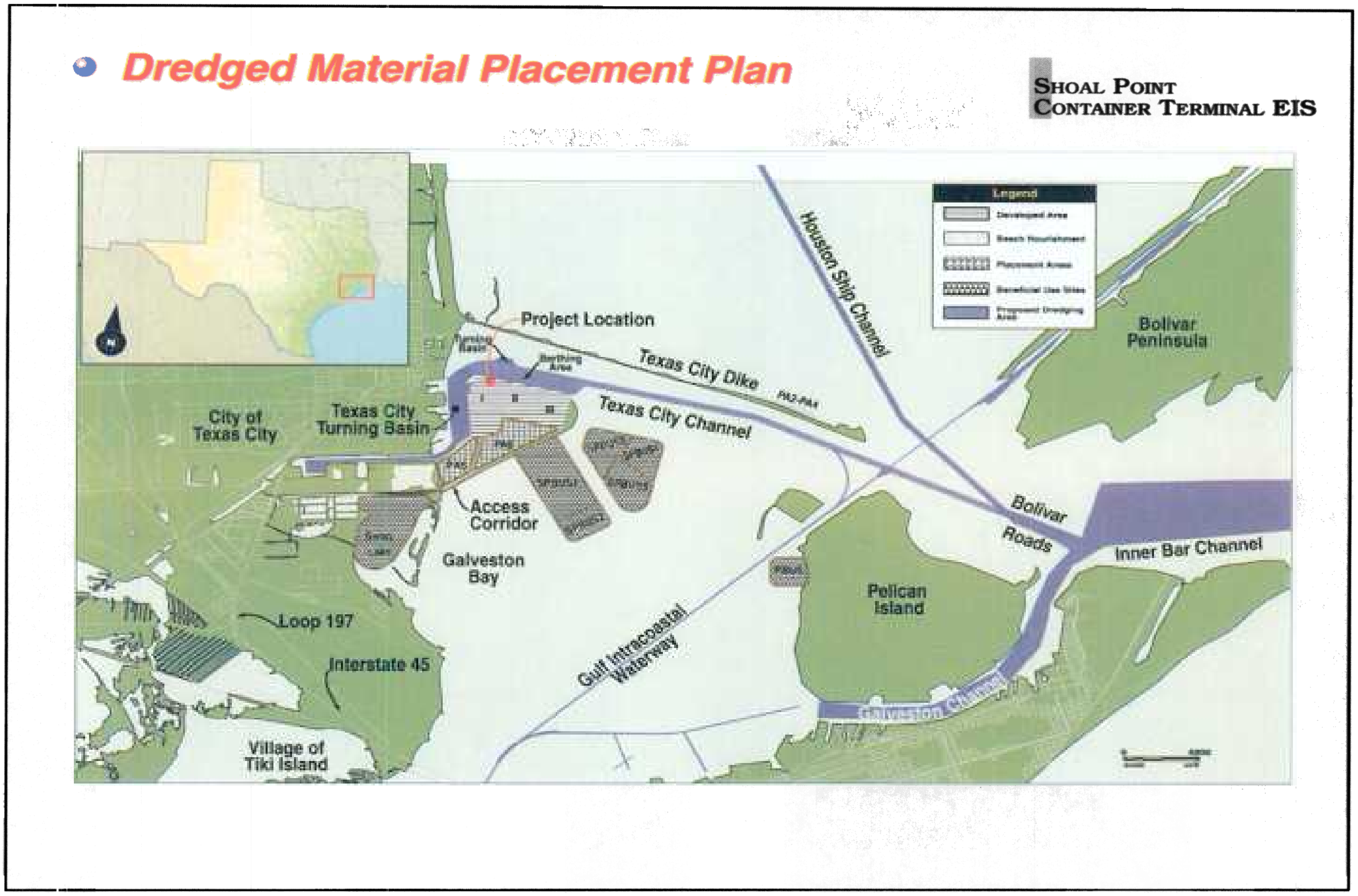

Figure 2. Footprint of Dredged Material Placement Plan, including SPPA1, authorized under USACE Permit 21979.

1.5 PROJECT AREA DESCRIPTION

Galveston Bay is an estuary of approximately 600 square miles in surface area, and is generally shallow, with typical depths in the interior of the bay ranging from 5 to 12 feet (Figure 3). Depths in central Galveston Bay are variable because of the presence of oyster reefs. Dredged navigation channels, with depths ranging from 12 to 45 feet, transect the bay system. The bay consists of several subsystems: Trinity Bay, East Bay, the confined portion of the Houston Ship Channel (HSC) above Morgan's Point, San Jacinto Bay, upper Galveston Bay (consisting of the area north of the Texas City Dike and west of the HSC), and West Bay.

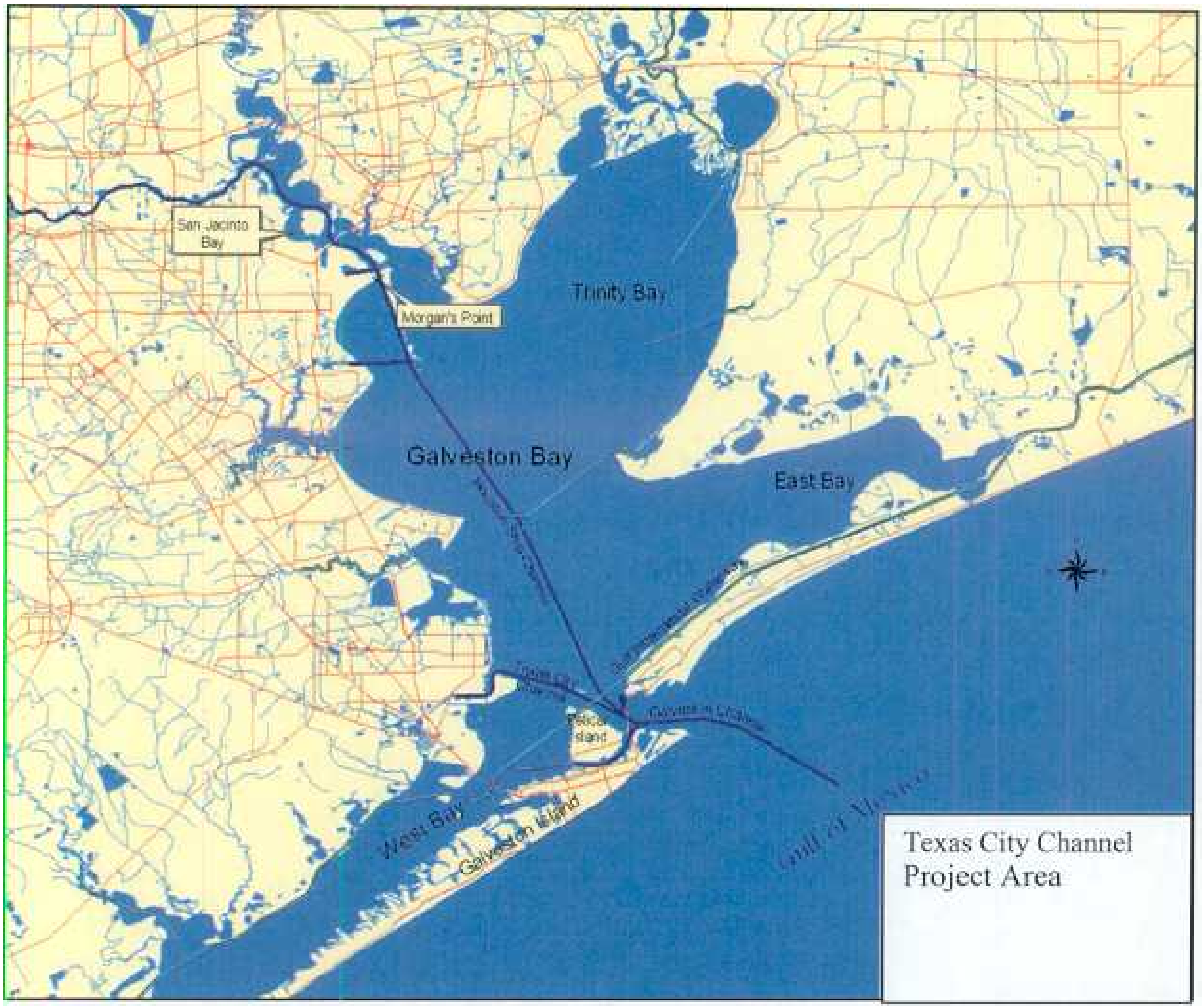

Figure 3. Project Area of Texas City Channel Deepening Project

An important feature in the bay system is the Texas City Dike along the west shore of Galveston Bay. This structure, which has existed in the Bay system in various forms since 1915, exerts an influence on the currents in the Bolivar Roads area and reduces the exchange of water between Galveston Bay and West Bay. At the same time, it reduces currents and sedimentation in the Texas City Channel.

Galveston Bay and its associated bays are separated from the Gulf of Mexico by a system of barrier islands and peninsulas. The main navigation channels in Galveston Bay include Galveston Harbor (the channel complex composed of the Entrance Channel, the Outer Bar Channel, and the Inner Bar Channel); Galveston Channel between Pelican Island and Galveston Island; the Texas City Channel; the HSC, which crosses the lower and upper Galveston Bays; and the Gulf Intracoastal Waterway (GIWW). Dredged material has been placed along most of these channels.

The portion of the Gulf of Mexico pertinent to the project area is the relatively shallow shelf area near the coast, which is largely devoid of significant physical features. The shelf slopes fairly uniformly at a rate of approximately 1 foot vertical to 2,000 feet horizontal, except within approximately 3,000 feet of the beach where the slope is steeper, about 1 foot vertical to 200 feet horizontal.

The coastal plain in the project area consists of a series of coastal terraces dipping gently seaward, with surface gradients ranging from less than 1 foot per mile near the coast to about 10 feet per mile along the inland margin to the coastal plain. These terraces are transversed by the floodplains of the San Jacinto and Trinity River valleys. The land surface of the coastal plain typically has little variation in elevation and generally does not have prominent terrain features.

1.6 HISTORY OF THE PROJECT

On March 4, 1913, the Texas City Channel was first authorized by House Document (H. Doc.) 1390, 62nd Congress, 3rd Session. The first project allowed for the construction of a pile dike and a 30 feet deep by 300 feet wide channel. Authorization was passed on July 3, 1930 for a harbor 800 feet wide and a rubble-mound dike, as described in H. Doc. 107, 71st Congress, 1st Session. Improvements to these basic features began in 1935 and are summarized by date of authorization in Table 1.

Table 1
Summary of Historical Authorizations

Date	***Work Authorized***	***Authorizing Documents***
Mar 4, 1913	Construct a channel (300 feet wide by 30 feet deep) and a pile dike along its north side	H. Doc. 1390, 62nd Congress, 3rd Session
Jul 3, 1930	Construct a harbor (800 feet wide and 30 feet deep) and a rubble-mound dike	H. Doc. 107, 71st Congress, 1st Session
Aug 30, 1935	Extend rubble-mound dike to shoreline	Rivers and Harbors Committee Doc. 4, 73rd Congress, 1st Session
Aug 30, 1935	Deepen channel and harbor to 32 feet	Rivers and Harbors Committee Doc. 46, 73rd Congress, 2nd Session
Aug 30, 1936	Deepen channel and harbor to 34 feet	Rivers and Harbors Committee Doc. 62, 74th Congress, 1st Session
Aug 26, 1937	Extend harbor 1,000 feet southward, 800 feet wide by 34 feet deep	Rivers and Harbors Committee Doc. 47, 75th Congress, 1st Session
Jun 30, 1948	Deepen channel and harbor to 36 feet, widen channel to 400 feet and harbor to 1,000 feet, and change name of channel from "Channel from Galveston Harbor to Texas City, Texas" to "Texas City Channel"	H. Doc. 561, 80th Congress, 2nd Session

Date	*Work Authorized*	*Authorizing Documents*
Jul 14, 1960	Deepen channel and turning basin to 40 feet and construct a 16 feet deep, 1.9-mile long Industrial Canal.	H. Doc. 427, 86th Congress, 2nd Session
Oct 12, 1972	Widen the existing Texas City Turning Basin to 1,200 feet, including relocation of the basin 85 feet to the east; provide a 40 feet deep channel in the Industrial Canal at widths of 300 to 400 feet, with a turning basin at the head of the canal 40 feet deep, 1,150 feet long, and 1,000 feet wide; ease the bend at the entrance of the canal; and reauthorize shallow-draft Industrial Barge Canal not incorporated in plan of improvement above	H. Doc. 199, 92nd Congress, 2nd Session (Section 201, PL 89-298)
Nov 17, 1986	Deepen the Texas City Turning Basin to 50 feet, enlarge the 6.7-mile-long Texas City Channel to 50 feet deep by 600 feet wide, establish 600 acres of wetlands, and develop water-oriented recreational facilities on a 90-acre enlargement of the Texas City Dike (not constructed)	Section 201, PL 99-662
Apr 12, 2001	The City of Texas City requested reactivation of the Texas City Channel project. Their request was based on the emergence of the Shoal Point Container Terminal project and the Port of Texas City and the Texas City Channel Users' renewed interest in deepening the Texas City Channel and existing turning basin to a depth of 45 feet	

1.7 NON-FEDERAL SPONSOR AND COORDINATION

The USACE Galveston District is responsible for the overall management of the study and the report preparation. The City of Texas City is the Non-Federal Sponsor for the study. The study is being coordinated with interested Federal, State, and local agencies and the public. The following are some of the agencies and groups that provided planning strategies and design input during the preparation of the report:

<u>Federal Agencies</u>
- U.S. Fish and Wildlife Service (USFWS)
- U.S. National Marine Fisheries Service (NMFS)
- U.S. Environmental Protection Agency (EPA)
- U.S. Coast Guard (USCG)
- U.S. Customs Service
- U.S. Department of Homeland Security

<u>Texas State Agencies</u>
- Texas Commission on Environmental Quality (TCEQ)
- Texas General Land Office (TxGLO)
- Texas Parks and Wildlife Department (TPWD)
- State Historic Preservation Officer (SHPO)

- Texas Department of Transportation (TXDOT)
- Texas Railroad Commission (TXRRC)

Texas Local Interest Groups

- Port of Texas City
- Texas City International Terminals (TCIT)

1.8 PRIOR PROJECTS AND REPORTS

A number of reports concerning the project or project area have been completed over the years. The following were reviewed as part of the reevaluation study:

1) Interim Feasibility Report and Environmental Impact Statement, Texas City Channel Report, Vol. III, September 1982.

2) Texas City Channel, Texas (50-Foot Project) General Design Memorandum (GDM), USAED-Galveston, January 1989.

3) Texas City Channel, Texas, Project Review and Assessment, USAED-Galveston, September 1997.

4) Dredged Material Management Plan, Shoal Point Container Terminal, Berger/Abam Engineers Inc., August 2001.

5) Shoal Point Container Terminal Project, EIS, USAED-Galveston, November 2002. Permit No.21979.

Report numbers one through three above were completed for the Texas City Channel Federal Project and appropriate information from the reports will be utilized as needed. Reports four and five were completed for a USACE Permit No. 21979 for the Shoal Point Container Terminal Project.

The Shoal Point Container Terminal Project, EIS (2002) and the DMMP, Shoal Point Container Terminal (2001) report were heavily utilized for existing conditions information and the basis for the DMMP for the recommended project. The Shoal Point Container Terminal Project was extensively coordinated with all appropriate Federal, State and local governmental agencies, as well as environmental organizations and the general public from the surrounding local communities. All authorizations required for a Federal activity from Federal, State and local governmental entities were granted.

1.9 PLANNING PROCESS AND REPORT ORGANIZATION

The most recent report completed by USACE for the Texas City Channel Federal Project was a Project Review and Assessment in September 1997. This report concluded that the authorized project continued to be economically justified and environmentally sound, but the potential existed for further improvements based on knowledge gained from more recent studies.

In November 2002 an EIS was completed for USACE Permit No. 21979 for the Shoal Point Container Terminal Project which included the deepening of the Texas City Channel to 45 feet. This assessment incorporates, by reference, data and information pertaining to the Texas City Channel Deepening Project from the Shoal Point Container Terminal EIS. 33 CFR 230.21 provides the authority to adopt a Federal agency's EIS in full or partial compliance of NEPA. The November 2002 permit EIS will be made available on the Galveston District USACE internet site address http://www.swg.usace.army.mil/ so reviewers of the current NEPA document can reference the approved EIS. If reviewers do not have internet access, a copy of the EIS on compact disc will be made available by contacting the USACE Galveston District.

This reevaluation study follows the recommendations given in the Project Review and Assessment. Those recommendations were that the required reevaluation of the project be based on current conditions, detailed design of the resultant recommended plan, environmental coordination, execution of a Project Cost-Sharing Agreement (PCA), and ultimately project construction.

The study process provided for a systematic preparation and evaluation of alternate plans which address study area problems and opportunities. The process involved all of the six functional planning steps:

- Specify Problems and Opportunities
- Inventory and Forecast Conditions
- Formulate Alternative Plans
- Evaluate Effects of Alternative Plans
- Compare Alternative Plans
- Select Recommended Plan

The following are some of the issues that were addressed in this reevaluation study and environmental analysis in consultation with State and Federal resource agencies and the public:

- Channel Design Optimization
- Ship Simulation Study
- Dredging Quantity Estimates
- Maintenance Patterns and Shoaling Rates
- Geotechnical Investigations for Levee Stability
- 50-Year DMMP
- Beneficial Uses of Dredged Material
- Pipeline Relocation Requirements
- Hydrodynamics of the Estuary
- Marine / Estuarine Resources
- Sediment and Water Quality
- Endangered Species
- Cumulative Impacts

- Cultural Resources

The chapter headings and order in this integrated report generally follow the outline of an Environmental Impact Statement. However, this report contains an Environmental Assessment. This Environmental Assessment (EA) has been prepared consistent with the provisions of 33 CFR 230.7(b) since the project changes may be approved under the discretionary authority of the Secretary of the Army.

Chapters of the report relate to the six steps of the planning process as follows:

* The second chapter of this report, **Problem Identification**, covers a portion of the first step in the planning process (specification of water and related land resources problems).

* The third chapter of this report, **Formulation Objectives, Constraints and Criteria**, addresses the remainder of step one in the planning process by identifying the potential water and related land resource opportunities, while addressing the concerns, planning objectives, identifying potential constraints, and developing the criteria to be used for evaluating plan formulation alternatives.

* The fourth chapter of this report, **Plan Formulation**, is the heart of the report and is therefore placed before the more detailed discussions of resources and impacts. It covers the third step in the planning process (formulation of alternatives), the fifth step in the planning process (comparison of alternative plans), and the sixth step of the planning process (selection of the recommended plan).

* The eighth chapter of this report, **Affected Environment**, covers the second step of the planning process (inventory, forecast and analysis of water and related land resources in the study area).

* And, the ninth chapter of this report, **Environmental Consequences**, covers the fourth step of the planning process (evaluation of the effects of the alternative plans).

2.0 PROBLEM IDENTIFICATION

2.1 OVERVIEW

The Texas City Channel continues to play a significant role in the growth and economic development of the Galveston, Texas City and Houston area. As growth and economic development of the study area continue, the need for more efficient movement of commodities increases, particularly crude petroleum, but also the proposed container vessel traffic.

With the current channel dimensions the tonnage is not being moved as efficiently due to the size restrictions of the larger tankers utilizing the channel. These tankers are primarily limited by the current depth of 40 feet.

2.2 NAVIGATION AND COMMERCE

Texas City's port experienced strong growth over the past decade, increasing from an average of 45 million short tons for 1990-91 to 58 million for 2000-02. The USACE national statistics show Texas City ranking 10th in the Nation in terms of total tonnage in 2005, up from 13th in early 1990's. The existing 40-foot project depth was designed to efficiently and safely accommodate vessels of approximately 40,000 Dead Weight Ton (DWT) with loaded drafts of 36 feet. Since the authorization of the existing project, the size and draft of vessels using the Texas City Channel have increased to meet the competitive demand for more efficient movements of bulk commodities, in particular crude petroleum and petroleum products. Texas City primarily serves as a crude petroleum, and petroleum and chemical product port. In addition to its existing petroleum and chemical tonnage base, the city of Texas City was issued a permit for the development of the Shoal Point Container Terminal in 2003.

Examination of the vessel sizes used for petroleum product imports and loading patterns at other Gulf Coast ports shows that up to 51 percent of product imports are transported in vessels with loaded drafts over 40 feet. Initial review shows that over 20 percent of petroleum coke export tonnage from other U.S. ports for 2001-02 were shipped in vessels with loaded drafts over 40 feet. Initial investigations suggest that between 50 and 80 percent of Texas City crude petroleum imports would benefit from a deeper channel. Deepening the Texas City Channel would improve transportation efficiency for larger vessels entering the Texas City Port area and eliminate the need to light-load vessels or perform offshore lightering of vessels.

2.3 SAFETY AND NATIONAL SECURITY

In light of recent world events, global concern regarding acts of international terrorism and organized crime has increased, leading to heightened domestic and international security at U.S. ports. Efforts led by the U.S. Customs Service, USCG and World Customs Organization have increased port security by requiring more stringent vessel inspections, deploying additional monitoring vessels, and increasing terminal owner/operator security measures. Programs such as Operation Noble Eagle, Operation Neptune Shield and additional Maritime Homeland Security concepts and strategies have been integrated into the daily operations of ports through coordination of USCG resources and partnerships with the maritime community and local law enforcement agencies. These partnerships are working to increase the local network of and interaction between Federal, State, and local law enforcement and intelligence agencies.

Texas City ranked among the top ten U. S. ports for the most recent 4-year period. It is one of the Nation's most important ports for the petro-chemical industry. A deeper channel which allows for safer and more efficient movement of crude and petroleum products is not only an economic benefit to the U.S. but also makes the channel safer for ship traffic and brings the U.S. a step closer to being more self-sufficient in the refining of fossil fuels. This can ultimately contribute to our national security. Improvements to navigation and the continued cooperation between international and national agencies and the private business sector contribute to the security of our Nation and its ports. In August 2000, during the development of the Shoal Point Container Terminal EIS, a Ports and Waterways Safety Assessment Workshop was held at the Texas City Port facility specifically to discuss port security. Representatives from public agencies and private sector interests were present including USCG.

2.4 ENVIRONMENTAL

The Galveston Bay system historically has been subject to the loss of wetlands. Both natural and artificial processes, including human-induced subsidence and relative sea level rise as well as draining and filling wetlands for development, have resulted in the conversion of wetland habitats to open water or upland habitat. The placement of dredged material presents an opportunity to benefit the ecology of Galveston Bay. Dredged material from the proposed project would be used beneficially to create intertidal marsh habitat.

3.0 FORMULATION OBJECTIVES, CONSTRAINTS, AND CRITERIA

3.1 OVERVIEW

This chapter presents the results of the first step of the planning process, the specification of water and related land resources problems and opportunities in the study area. The chapter concludes with the establishment of planning objectives and planning constraints, which is the basis for the formulation of alternative plans.

3.2 NATIONAL OBJECTIVES

The fundamental national objective of Federal participation in water resources development projects is to assure that an optimum contribution is made to the welfare of all people. The Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies dated March 1983 and the National Environmental Policy Act of 1969 (NEPA) provide the basis for Federal policy for planning Federal water resources projects. These authorities have established the procedures for formulation and evaluation of water resources projects. Additional policies and regulations, derived from executive and legislative authority, further define the criteria for assessment of plan impacts, risk analysis, review and coordination procedures, and project implementation.

Current Federal policy dictates that National Economic Development (NED) is the primary national objective in water resources planning. NED objectives stress increasing the value of the Nation's output of goods and services and improving economic efficiency on a national level. The Federal objective of water and related land resources planning is to contribute to NED in a manner that is consistent with protecting the Nation's environment. Consequently, the resource's condition should be more desirable with the selected plan than under the without-project condition.

National objectives are designed to assure systematic interdisciplinary planning, assessment, and evaluation of plans addressing natural, cultural, and environmental concerns, which will be responsive to Federal laws and regulations. In addition to the selected NED plan, the proposed project includes environmental restoration features that will protect and enhance valuable habitat identified during the study.

3.3 PUBLIC CONCERNS

A number of concerns have been identified during the course of the study. Input was received through coordination with the non-Federal Sponsor, coordination with Federal and State agencies and public meetings. The majority of the concerns/comments from the public that are related to the establishment of planning objectives and planning constraints are:

- Encourage the beneficial use of dredged material for the construction of artificial bird islands and inter-tidal marsh.
- Expression of support for the proposed deepening to -45 feet.

3.4 PLANNING OBJECTIVES

The primary objective of Federal navigation activities is to contribute to the Nation's economy while protecting the Nation's environmental resources in accordance with existing laws, regulations, and executive orders. More specific planning objectives were identified by area residents and concerned State and Federal agencies or suggested by existing opportunities for improving the quality of life. Plans were formulated and evaluated with the following objectives in mind:

1) To improve the efficiency and safety of the deep-draft navigation system, and

2) To maintain or enhance the quality of the area's coastal and estuarine resources.

3.5 PLANNING CONSTRAINTS

Plans must be formulated with regard to addressing the problems and needs of the area, taking into consideration future without-project conditions. The plans should identify tangible and intangible benefits and costs from economic, environmental, social, and regional perspectives. Institutional implementation constraints should also be identified. The formulation framework requires the systematic preparation and evaluation of alternative solutions to the recognized water resource-related problems within the study area. The process also requires that impacts of the proposed action be measured and results displayed or accounted for in terms of contributions to: NED, Environmental Quality, Regional Economic Development, and Other Social Effects. This is accomplished throughout the different sections within the report.

Interaction with other interests must be maintained throughout the planning process to avoid duplication of effort, minimize conflicts, obtain consistency, and assure completeness. The following constraints apply to this study:

- Fish and wildlife habitat affected by a project plan should be preserved, if possible;

- The study process and plans developed must comply with Federal laws and policies; and

- Alternative plans that resolve problems in one area should not create or amplify problems in other areas.

Current guidance specifies that the Federal objective of planning is to contribute to NED consistent with protecting the Nation's environment. The following general criteria are applicable to all water resource studies. They have generally guided the formulation of this study. Technical, economic, environmental, and social criteria have been established to guide the project development process. These criteria are discussed below.

3.6 TECHNICAL CRITERIA

Technical criteria require the preservation of adequate project dimensions to provide safe passage of commercial navigation traffic through this reach of the waterway while minimizing environmental impacts. These criteria require plans to be compatible with navigation needs and consistent with the requirements of the navigational equipment using this portion of the waterway and to provide a long-term plan for the placement of dredged materials in order to continue maintenance of the waterway in the future.

Formulation of alternative alignments and dredged material placement alternatives and their evaluation were accomplished by analysis of historical and projected shoaling rates, erosion causes and rates, and general structural and non-structural alternatives applicable for conditions which are specific to this area. Technical information, both historical data and specific information prepared for this project, used during this study included, but was not limited to, salinity model data, ship simulation results, aerial photography, historical dredging records, and previously published scientific reports related to this area.

3.7 ECONOMIC CRITERIA

The economic criteria require that tangible benefits attributable to projects exceed project costs. Project benefits and costs are reduced to average annual equivalent values and related in a ratio of benefits to costs (Benefits-to-Cost ratio or BCR). This ratio must exceed unity to meet the NED objective. Selected plans, whether structural, nonstructural, or a combination of both, should maximize excess benefits over costs; however, unquantifiable features must be addressed subjectively. These criteria are used to develop plans that achieve the objective of NED and provide a base condition for consideration of economically unquantifiable factors which may impact on project proposals.

All structural and nonstructural measures for navigation projects should be evaluated using the appropriate period of analysis and the currently applicable interest rate. Total annual costs should include amounts for operation, maintenance, major replacements, and mitigation, as well as amortization and interest on the investment.

3.8 ENVIRONMENTAL CRITERIA

The general environmental criteria for navigation projects are identified in Federal environmental statutes, executive orders, and planning guidelines. It is the national policy that fish and wildlife resource conservation be given equal consideration with other study purposes in the formulation and evaluation of alternative plans. The basic guidance during planning studies is to assure that care is taken to preserve and protect significant ecological, aesthetic, and cultural values, and to conserve natural resources. These efforts also should provide the means to maintain and restore, as applicable, the desirable qualities of the human and natural environment. Alternative plans formulated to improve navigation should avoid damaging the environment to the extent practicable and contain measures to minimize or mitigate unavoidable environmental damages. Particular emphasis was placed on the following:

- Protection, preservation, and improvement of the existing fish and wildlife resources along with the protection and preservation of estuaries and wetland habitats and water quality;

- Consideration in the project design of the least disruptive construction techniques and methods;

- Mitigation for project-related unavoidable impacts by minimizing, rectifying, reducing or eliminating, compensating, replacing, or substituting resources;

- Preservation of significant historical and archeological resources through avoidance of artifacts and mitigation of artifacts that cannot be avoided.

3.9 SOCIAL AND OTHER CRITERIA

Plans proposed for implementation should have an overall favorable impact on the social well-being of affected interests and have overall public acceptance. Structural and nonstructural alternatives must reflect close coordination with interested Federal and State agencies and the affected public. The effects of these alternatives on the environment must be carefully identified and compared with technical, economic, and social considerations and evaluated in light of public input.

4.0 PLAN FORMULATION

4.1 OVERVIEW

This chapter describes the development of alternative plans that address the planning objectives, the comparison of those plans and the selection of the recommended plan. It also describes the recommended plan and its implementation requirements.

4.2 PLAN FORMULATION RATIONALE

The planning framework requires the systematic preparation and evaluation of alternative ways of addressing problems, needs, concerns, and opportunities while considering environmental factors. The criteria and broad planning objectives previously identified form the basis for subsequent plan formulation, screening, and ultimately plan selection.

The planning process for this study has been primarily driven by the overall objective of reviewing and updating a comprehensive plan that would allow safe and efficient ship traffic along the Texas City Channel, while protecting the Nation's environmental resources. The first phase of this process was to review the existing authorization, PCA, and prior studies to establish the necessary level of review and identify areas of data collection needed to move forward with reevaluating the study. A limited array of alternative solutions to meet the existing and long-range future needs of the area was developed.

The expected future without-project (No Action) alternative was based on assumptions related to the City's request to utilize 400 acres of the existing, active dredged material PA for the proposed Shoal Point Container Terminal. As part of the Permit Special Conditions, the City is required to replace the lost capacity of the Shoal Point PA by constructing the SPPA1 to be located adjacent to the southeast portion of the existing PA and in accordance with the DMMP associated with the permit. For this study, the non-structural measures of one-way vessel traffic for piloted vessels and two-way traffic for tows, which is the current practice in the Texas City Channel, were reviewed. For the structural plans, four channel depths were evaluated and screened primarily utilizing information from the Texas City GDM, the Shoal Point Container Terminal EIS, and input from the Port of Texas City.

4.3 MANAGEMENT MEASURES AND PRELIMINARY PLANS

Future Without-Project Condition (No Action)
The USACE is required to consider "No Action" as one of the alternatives to comply with the requirements of the National Environmental Policy Act (NEPA). With the No Action plan, which is synonymous with the "Future Without-Project Condition," it is assumed that no new project would be implemented by the Federal Government or by local interests to achieve the planning objectives. The No Action Plan forms the basis against which all other alternative plans are measured.

The Future Without-Project Condition alternative includes retaining the 40 feet deep and 400 feet wide Texas City navigation channel. The current channel depth would continue to limit the efficient movement of commodities by vessels traveling the waterway. The efficiency of the channel would be further burdened by the fact that the adjacent Houston and Galveston entrance channels are currently dredged to -45 feet.

As vessels increase in draft, the restrictive depth of the waterway would prevent some vessels from entering with full loads or prevent larger vessels from even utilizing the waterway. The need to lighter products and/or light loaded vessels would increase, thereby increasing overall user costs and decreasing the efficiency of the vessels using the waterway.

Adverse impacts on natural resources in the region have resulted from general trends in population growth and economic development. Such effects are expected to continue as a result of development related to continued growth in the region. These impacts, and impacts resulting from the proposed action, combine and interact to result in cumulative effects on the region. Potentially adverse cumulative effects associated with past and continued future development of the area include loss of habitat, air and water quality impacts, and conversion of land uses. Beneficial effects of development in the region include new economic opportunities, housing alternatives, employment opportunities and recreational resources.

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Alternatives

A management measure or alternative is a feature or activity at a site, which addresses one or more of the planning objectives. A wide variety of measures are usually considered. However, because this is a reevaluation of a previously authorized project, the measures that were considered in this study were limited.

Non-Structural

Non-structural measures of one-way vessel traffic for piloted vessels and two-way traffic for tows are the current practice for the Texas City Channel. The one-way traffic restriction is accommodated through the Pilots, the U. S. Coast Guard Vessel Traffic System (VTS), and Harbormaster communications. There are currently no plans to deviate from current practices.

Structural

Structural measures considered included alternatives for deepening and incidental widening of the existing Texas City channel. The deepening of the existing 40-foot channel would allow for existing and larger ships to more fully utilize the channel. A deeper channel will require more available PA for new work construction and continued maintenance of the channel. Any placement plan considered should ensure that the placement alternatives address the required capacities and minimize adverse impacts to the environment.

Locally Preferred Plan (LPP)
The locally or sponsored-preferred plan would deepen the Texas City Turning Basin and the Texas City Channel to -45 feet mean low tide. No widening of the channel would occur, other than the incidental widening that would result when deepening the channel to 45 feet while maintaining the existing bottom width. The Bolivar Roads Channel, Inner and Outer Bar Channels, and the Entrance Channel have already been deepened to a 45-foot project depth in conjunction with the deepening and widening of the Houston-Galveston Navigation Channel. Dredged material would be hydraulically pumped to two (2) existing PAs and used beneficially to create marsh habitat in proposed open-water PAs adjacent to Shoal Point in accordance with the DMMP in the Permit.

Final Array of Alternatives
The objective of a general reevaluation study is to arrive at a selected plan after a reasonable number of alternatives have been analyzed. This involves a comparison between each alternative and the future without-project condition consequences, considering economic, environmental and social impacts. Additionally, project alternatives were compared to the 1986 WDRA authorized 50-foot plan. Developing the channel at the authorized 600-foot width was analyzed and discussed with the sponsor and industry and agency representatives early in the study process. Industry and the sponsor were opposed to expanding the width of the channel from its' 400-foot width citing safety hazards of two-way vessel traffic. Even at 600-foot wide channel, today's larger vessels would require towing through the channel. In the one-way channel, a pilot is able to maneuver the vessel through the channel w/o the assist of a tow. If two-way traffic were introduced, a tow would be required to tow vessels to and from port. The benefits of two-way traffic did not out weigh the continued use of a one-way channel at 400-foot width. The cost of the dredging and depositing the additional new work material lowered the benefits and raised construction costs. The sponsor, industry and agency representatives agreed to maintain the 400-foot channel width.

Project alternatives were determined by reviewing past studies and taking into consideration the currently maintained channel depth (40-foot) and the currently maintained Houston/Galveston Entrance Channel depth (45-foot).

The alternatives analyzed included:

- No Action Plan
- Deepening the channel to -43-foot (with incidental widening)
- Deepening the channel to -44-foot (with incidental widening)
- Deepening the channel to -45-foot (with incidental widening)
- Deepening the channel to -48 foot (with incidental widening)
- The Authorized 50-foot channel (with incidental widening)

The No Action Plan assumes that USACE would maintain the channel at the current 40-foot depth regardless whether the City of Texas City, as the permittee for the Shoal Point Container Terminal development, deepens the channel to 45-feet.

Additionally, the permittee is responsible for replacing lost capacity of 400 acres from the Shoal Point PA, due to the terminal's proposed development on the PA. Unless the permittee returns the land for use as a PA, the replacement PAs (SPPA1 and 1A) as proposed in the Shoal Point Container Terminal development, need to be constructed.

5.0 ECONOMIC EVALUATION

5.1 OVERVIEW

Per ton FY2005 transportation costs for channel depth alternatives of 43, 44, 45, 48 and 50 feet were compared with the existing 40-foot channel depth. The project benefits were calculated for a 50-year period of analysis using FY2005 Economic Guidance Memorandum 05-01 deep-draft vessel operating costs and the FY2007 Federal discount rate of 4.875 percent. The first year of the project life is expected to be 2010. The project benefits are based on reductions in transportation costs stemming from more efficient vessel loading and a higher utilization of larger vessels.

5.2 WITHOUT-PROJECT CONDITION

The Texas City Channel complex contains 34 waterfront facilities. Six large industrial entities operate and/or jointly operate a total of 15 facilities equipped to handle crude oil and petroleum and chemical products. There are three that receive crude petroleum, all of which can accommodate tankers in excess of 150,000 Deadweight Tons (DWT). The majority of project benefits are for crude petroleum. The remaining facilities handle liquid bulk materials and dry cargoes. In addition, the Port of Texas City was issued a permit for the private development of the Shoal Point Container Terminal in 2003. Initial groundbreaking for the container terminal began early in 2005. However construction on the terminal has not begun. For purposes of the Federal project and the GRR analysis, the operation of the container terminal is part of the without project condition.

In 2005, Texas City ranked 10th in the U.S. in tonnage volume, with 57.8 million short tons. Texas City ranked among the top ten U.S. ports during the most recent 3-year period. Over 80 percent of Texas City's 57.8 million 2005 tonnage total consists of deep-draft ocean-going movements. The remaining 20 percent, a total of 10.9 million short tons, consists of shallow-draft GIWW traffic. Comparison of Texas City's 1990-2005 deep-draft tonnage with U.S. tonnage reveals that Texas City's average annual growth rate of 2.3 percent for total deep-draft tonnage is 53 percent higher than the national average annual growth rate of 1.5 percent.

Table 2 presents Texas City 1990-2005 total tonnage and principal deep-draft movements. Crude petroleum consistently dominated total tonnage. Crude petroleum presently represents 63 percent of combined deep- and shallow-draft total. In spite of declines in 2005 crude oil imports, Texas City's combined deep-draft tonnage generally maintained higher growth rates than the nation. Average 2003-2005 volumes represent a 40 percent increase from 1993-1995. The drop in Texas City's 2005 crude oil imports was primarily due to extended shutdowns for maintenance. Both Gulf Coast and U.S. crude oil imports declined in 2005 as well.

Approximately 80 percent of 2000-05 crude oil tonnage was shipped in vessels greater than or equal to 90,000 DWT with median design drafts of 45 feet or more. Nearly 75 percent of crude oil tonnage was shipped in vessels with loaded drafts greater than 36 feet and nearly 90 percent was shipped in vessels with design drafts over 40 feet[1]. Current traffic generally consists of one-way traffic for deep-draft piloted vessels and two-way traffic for inland waterway tows.

Table 2
Texas City Channel Tonnage by Major Commodity Group (1000's of short tons)

		Major Deep-Draft Commodities				Major	Ocean-	
	Crude Oil	Petroleum Products		Chemical Products		Group	Going	Total
Year	Imports	Imports	Exports	Imports	Exports	Total	Total	Tonnage
1990	25,184	480	1,166	320	618	27,768	34,003	48,071
1991	20,348	326	1,876	195	658	23,403	29,500	43,290
1992	26,435	448	1,181	249	1,101	29,414	29,778	43,104
1993	33,111	291	1,470	386	736	35,994	40,536	53,653
1994	22,863	445	274	275	537	24,394	30,068	44,351
1995	27,781	962	506	1,003	528	30,780	35,607	50,403
1996	31,901	500	1,365	429	890	35,085	41,208	56,394
1997	33,900	639	1,758	442	568	37,307	42,379	56,646
1998	27,958	237	1,633	265	1,149	31,242	37,134	49,477
1999	26,900	791	1,483	191	1,706	31,071	36,376	49,503
2000	34,646	1,519	2,871	519	1,533	41,088	47,797	61,586
2001	38,688	1,382	2,263	261	1,449	44,043	49,985	62,270
2002	32,864	2,326	1,540	451	1,154	38,368	43,524	55,233
2003	38,773	1,254	1,794	157	1,323	43,301	48,697	61,338
2004	42,845	3,175	3,082	189	1,281	50,572	55,509	68,283
2005	35,644	2,097	4,278	151	1,230	43,400	46,927	57,839
		1990-2005 Compound Annual Growth Rates						
	2.3%	10.3%	9.1%	-4.9%	4.7%	3.0%	2.2%	1.2%

Source: USACE, Waterborne Commerce of the U. S., Part 3, 1990-2005.

Since the 1970's, both Texas City and U.S. crude petroleum imports have steadily risen as U.S. crude production has fallen and been replaced by foreign imports of crude. The Energy Information Administration (EIA) in its Annual Energy Outlook (AEO) 2007 projected continuing declines in U.S. production over the 2005-2030 forecast period, along with steady growth of imports. The EIA shows U.S. crude petroleum production declining from 5.18 million barrels per day in 2005 to 5.39 million barrels day in 2030, with an average annual compound growth rate of 0.2 percent. Over the same period, Alaskan production is projected to decline by -4.7 percent annually.

5.3 CRUDE PETROLEUM AND ENERGY DEMAND INDICATORS

The U.S. Gulf Coast leads the nation in refinery capacity, with 41 percent of the nations' crude oil distillation capacity. Products, such as gasoline, heating oil, diesel and jet fuel, are

[1] U. S. Army Corps of Engineers, Waterborne Commerce of the United States, Navigation Data Center, detailed data files.

transported from the Gulf Coast to the East Coast and the Midwest. Approximately one-half of the Gulf Coast refinery capacity is in Texas and the remainder is in Louisiana. Texas City's refinery capacity represents 4.2 percent of the national total and 15 percent of the state total (Table 3). Texas City's current capacity is 722,750 barrels per calendar day, up by 15 percent since 1994.

Table 3
Texas City Atmospheric Crude Oil Distillation Capacity and Percentage of State and National Totals

	Texas City Refinery Capacity *		
Capacity as of	Barrels/day	% Texas Total	% U. S.
1-Jan-94	626,500	14.0%	4.2%
1-Jan-99	657,000	15.7%	4.0%
1-Jan-00	661,000	15.6%	4.0%
1-Jan-01	661,000	15.4%	4.0%
1-Jan-02	713,000	15.9%	4.2%
1-Jan-03	724,000	16.7%	4.3%
1-Jan-04	713,000	15.9%	4.2%
1-Jan-05	718,950	15.5%	4.2%
1-Jan-06	722,750	15.4%	4.2%

* Texas City's atmospheric crude oil distillation capacity in January 2005 was 718,950 barrels per day, equals approximately 39,455,690 short tons. U. S. capacity was nearly 18 million barrels per day.
Source: U. S. Department of Energy, Energy Information Administration, extracted from detailed files.

The amount of crude petroleum imported into Texas City is dependent upon the area's capacity to refine crude and/or pipeline it to other refining complexes. Texas City's 2001-2005 crude petroleum import volumes are within 95 percent of crude petroleum refining capacity; however, approximately 30 percent of Texas City's crude imports are pipelined out of Texas City which provides additional capacity to process and refine remaining imports .

Texas City refinery trends are similar to other U.S. refineries with declines in refinery capacity through the mid-1990s. The EIA notes that falling demand for petroleum and deregulation of the U.S. refining industry in the 1980s led to 13 years of decline in U.S. refinery capacity. The trend toward declining U.S. capacity was reversed to some extent in the mid-1990s, and 2 million barrels per day of distillation capacity was added between 1996 and 2005. Table 4 displays U.S. total annual crude petroleum refinery data for the period 1965-2006.

The EIA notes that financial and legal considerations make it unlikely that new refineries will be built in the United States; however, additions at existing refineries are on-going[2], and this is evident in Texas City. In spite of recognizable constraints, the EIA's most recent projections (AEO2007) show import levels increasing throughout the 2005-2040 forecast period.

[2] Energy Information Administration, Annual Energy Outlook 2005, "Market Trends – Natural Gas Demand and Supply", p. 7.

Table 4
United States 1965-2006
Refinery Capacity and Utilization

Year	Number of Operating Refineries	Refinery Capacity Barrels/Day	Gross Input to Distillation Barrels/Day	Operable Refineries Utilization Rate
1965	293	10,419,851	9,535,395	91.5%
1970	276	12,021,273	11,491,018	95.6%
1975	279	14,960,710	12,873,296	86.0%
1980	319	17,988,121	13,802,736	76.7%
1985	223	15,658,769	12,137,936	77.5%
1990	205	15,571,966	13,579,314	87.2%
1991	202	15,675,627	13,477,804	86.0%
1992	199	15,696,155	13,607,175	86.7%
1993	187	15,120,630	13,820,256	91.4%
1994	179	15,034,160	14,000,343	93.1%
1995	175	15,434,280	14,087,230	91.3%
1996	170	15,333,450	14,344,353	93.5%
1997	164	15,451,785	14,804,822	95.8%
1998	163	15,711,000	15,079,207	96.0%
1999	159	16,261,290	15,052,213	92.6%
2000	158	16,511,871	15,312,512	92.6%
2001	155	16,595,371	15,340,367	92.6%
2002	153	16,785,391	15,138,719	90.7%
2003	149	16,757,370	15,508,000	92.6%
2004	149	16,894,314	15,783,000	93.4%
2005	148	17,124,870	15,578,000	89.9%
2006	149	17,338,814	n/a	n/a
1980-1990 Average	249	16,406,285	13,173,329	80.5%
1991-1997 Average	182	15,392,298	14,020,283	91.1%
1998-2005 Average	154	16,580,185	15,349,002	92.6%

Source: U.S. Department of Energy, Energy Information Administration.
http://tonto.eia.doe.gov/dnav/pet/pet_pnp_unc_dcu_nus_a.htm

At the same time, domestic distillation capacity is forecasted to increase by over 17 percent between 2005 and 2030. In comparison to the 1981 peak of 18.6 million barrels per day, distillation capacity is projected to grow from the 2005 year-end level of 17.1 million barrels per day to 20 million barrels per day in 2030 in the reference case and 22.3 million in the high oil price case. Almost all new capacity additions are projected to occur on the Gulf Coast. Existing refineries are expected to continue to be utilized intensively (92 to 95 percent of operable capacity) throughout the EIA forecast period. The 2005 U.S. refinery utilization rate was approximately 91 percent, well above the lows of 69 percent during the 1980s and even the 88 percent mark during the early 1990s but down about 4 percent since the late nineties and early 2000s. The decrease in U.S. refinery utilization also reflects capacity expansions completed in recent years. The availability of excess capacity is encouraging to industry. EIA emphasizes that distillation capacity increases are expected due to improved processing of the intermediate streams obtained from crude distillation and subsequent reductions in residual fuel. Texas City industry personnel confirmed improved processing realizations and expect continued improvement.

The EIA expectation is that the market for residual is shrinking and the improved distillation processing will produce higher value "light products" such as gasoline, distillate, jet fuel, and liquefied petroleum gas. Texas City records for 2000-2005 show residual fuel movements relatively low in comparison to distillate. Texas City distillate imports, as well as exports and coastwise shipments, have exhibited significant growth over the last decade. Foreign exports increased from 50,000 short tons in 1995 to an average of 731,000 short tons for 2003-2005. Over the same period, imports grew from 235 thousand to 1.7 million short tons. Deep-draft coastwise distillate shipments increased from 135,000 short tons in 1995 to 712,000 short tons for 2003-2005 In spite of current and future increases, the EIA expects that world demand for "light products" will be supplemented by foreign markets, particularly in the Asia/Pacific region. Refinery construction in developing countries is noted to generally necessitate configurations that are more advanced than those currently in operation in the U.S. Additionally, foreign refineries are expected to supply lighter products from crude oil grades whose quality is anticipated to deteriorate between 2005 and 2030. The expected increase in product imports are generally more reflective of the U.S. regions other than the Gulf as the Texas City refineries have the capability to refine several grades of crude petroleum and this capability has resulted in a large market share.

While recognizing overall trends and associated limitations, both EIA (January 2007) and Global Insight (2007) show imports increasing over the forecast period. Additionally exports are projected to increase but at a more modest rate. Both the EIA and Global Insight provide forecasts of product imports; product forecasts indicators are more general. The EIA, in their AEO2007 publication, is forecasting an average annual growth of 0.9 percent for 2005-2030 U.S. product exports. Examination of Texas City's long-term product exports 1990-2005 trendline shows general upward movement with average annual growth of 9.1 percent. Product exports grew from about 1,166 thousand in 1990 to 4.3 million in 2005, with 2005 volumes representing a record high. Texas City's product exports consist primarily of petroleum coke. For the period 1990-2005, U.S. total product exports increased from 46 million to 63 million, with coke exports increasing from 16 million to approximately 30 million. Recognizing that income may be indicative of trade patterns, it should be noted that Global Insight is forecasting average annual growth rates of about 4 percent for U.S. income related to exports of industrial materials, which includes petroleum products.

In addition to potential uncertainty related to refinery capacity, the effect of price increases was investigated. An outcome of high oil prices and world stability concerns experienced throughout 2007 demonstrates obvious uncertainty inherent in forecasting crude oil markets. Crude oil prices in the AEO2007 reference forecast are substantially higher than the AEO2005 forecast but are lower than other projections. Table 5 displays comparison of the AEO2007, Global Insight, Inc., and Deutsche Bank petroleum import forecasts. The AEO2007 release shows average annual growth rates of -0.04 percent for 2005-2015 and 1.8 percent for 2015-2030. Global Insight shows annual growth of 0.9 percent for the entire 2005-2015 and 1.4 percent from 2015-2030; and Deutsche shows 1.9 for 2005-2015 and 2.1 percent for 2015-2030. Global Insight and Deutsche provide a combined forecast of crude oil and products, the higher rates of growth likely associated with petroleum products.

Analysis of Texas City's historical trend, and discussions, with industry suggest that Texas City is more likely to experience growth slightly above the national rates for crude petroleum but lower rates than the nation for products. Texas City's present and future distribution will continue to reflect relatively higher imports of the base materials due to its role as a refiner.

Table 5
Comparison of Annual Energy Outlook (AEO) and Alternative Forecasts
U.S. Crude Oil Imports 2005 and 2015-2030 and
World Oil Price

Year	AEO 2006	AEO 2007	Global Insight a/	Deutsche Bank a/
Crude Petroleum and Products (Millions of Barrels Per Day)				
2004-05	12.57	12.57	12.57	12.57
2015	13.33	12.52	13.75	15.37
2025	15.60	14.87	17.03	19.31
2030	17.09	16.37	17.03	21.13
Average Annual Growth Rates				
2004/05-2015	0.6%	-0.04%	0.9%	1.9%
2015-30	1.7%	1.8%	1.4%	2.1%
Crude Oil Prices/Barrels (2005 $)				
Year	AEO 2006	AEO 2007	Global Insight	Deutsche Bank
2005	$55.76	$56.76	$56.76	$51.63
2015	$48.50	$49.87	$46.54	$40.11
2030	$57.82	$59.12	$40.25	$40.16

Source: U.S. Department of Energy, Energy Information Administration, 2007 Annual Energy Outlook, February 2007.
a/ As presented in the 2007 Annual Energy Outlook.

Uncertainties associated with imports also relates to oil depletion and growth of alternative fuels. The EIA notes in its "Issues in Focus" discussion (January 2005) that while fossil fuels are no doubt, subject to depletion, increased scarcity and subsequent higher prices, there are many resources that are not heavily exploited. Higher prices and the inference of profit increases can be expected to lead to the development of sites and technologies, including production from oil sands, ultra-heavy oils, gas-to-liquids technologies (GTL), coal-to-liquids technologies (CTL), bio-fuel ultra-heavy oils, bio-fuel technologies, and shale oil. Non-conventional liquid production is noted as a potential buffer against high oil prices.

In the 2007 State of the Union Address, President Bush set the goal of cutting U.S. consumption of gasoline by 20 percent in the next 10 years. In order to meet this goal, the President proposed reforming fuel economy standards to make cars more energy efficient. On the supply side, the President has proposed increasing the supply of alternative fuels by setting a mandatory fuels standard to require 35 billion gallons of renewable and other alternative fuels in 2017. The use of alternative fuels, such as ethanol, biodiesel, and CTL, is projected to increase substantially in the reference case as a result of the higher prices projected for traditional fuels and the support for alternative fuels provided in recently enacted Federal legislation. Texas City's petroleum import forecast recognizes the effect of alternative fuel utilization because it is based on direct application of the AEO projections. The expectation is that Texas City's focus will continue as a petroleum refinery center for the AEO forecast period and have a relatively smaller role than other U.S. regions in alternative fuels.

5.4 TEXAS CITY COMMODITY PROJECTIONS

Table 6 summarizes the commodity projections used for Texas City's base line benefit calculations. Texas City's ocean-going tonnage forecasts are based on application of the EIA 2006 Annual Energy Outlook and a regression equation incorporating 1975-2003 Texas City and U.S. historical imports and applying the AEO2006 2003-2030 projections. The effect of using the more recent AEO2007 forecast and the inclusion of 2004-2005 Texas City tonnage was evaluated as a sensitivity analysis. The results of that sensitivity analysis showed that the crude petroleum projections were within 0.2 percent of the 2010-2030 forecast values shown in Table 6. Additional results from that analysis are contained in the sensitivity section of the economic appendix.

Table 6
Texas City Projections for Commodity Groups Used for Benefit Calculations
Totals by Commodity Group (1,000's of short tons)

	Crude Petroleum	Petroleum Products		
Year	Imports	Imports	Exports a/	Coastwise Shipments
1999	26,900	791	692	3,687
2000	34,646	1,519	842	5,058
2001	38,688	1,382	1,056	4,590
2002	32,864	2,326	720	3,092
2003	38,773	1,254	910	3,963
2001-03	36,775	1,654	895	3,882
2010	43,680	2,186	966	4,304
2020	53,246	2,842	1,015	4,898
2030	64,351	3,379	1,055	5,573
2040	71,084	4,016	1,096	6,341
2050	78,520	4,775	1,138	7,215
2060	86,735	5,677	1,183	8,210
	Average Annual Tonnage Growth Rate (2001/03 to 2030)			
	2.0%	2.7%	0.6%	1.3%
	Average Annual Tonnage Growth Rate (2030-2060)			
	1.0%	1.7%	0.4%	1.3%
	Average Annual Tonnage Growth Rate (2001/03-2060)			
	1.1%	2.1%	0.5%	1.3%
	Crude Petroleum	**Petroleum Products**		
Year	**Imports**	**Imports**	**Exports a/**	**Coastwise Shipments**
2010	34,944	895	145	430
2020	42,597	1,164	152	980
2030	51,481	1,383	158	1,115
2040	56,867	1,644	164	1,268
2050	62,816	1,955	171	1,443
2060	69,388	2,324	177	1,642

a/ Excludes petroleum coke. Petroleum coke is exported from an area not in the 45-foot reach.

Source: U. S. Department of Energy, Energy Information Administration, 2006 Annual Energy Outlook, December 2005 application.

5.5 PETROLEUM VESSEL FLEET EXPECTATIONS AND PROJECT BENEFICIARIES

Texas City's existing 40-foot project depth was designed to efficiently and safely accommodate vessels of approximately 40,000 DWT with loaded drafts of 36 feet. Since construction of the existing 40-foot project in 1967, the size and draft of vessels have increased to meet the competitive demand for more efficient movements of bulk commodities, in particular crude petroleum and petroleum products. Examination of the vessel sizes used in the transport of crude petroleum and, to a lesser extent, petroleum products revealed that significant transportation savings could be realized from larger vessel loads. Project benefits calculations were made for crude petroleum imports, petroleum product imports and exports, and coastwise movements of petroleum products transported through to docks adjacent to the Texas City Turning Basin[3]. The turning basin section of the Texas City Channel contains six docks that can receive crude petroleum, four of which can accommodate tankers in excess of 150,000 DWT. These docks receive all of Texas City's crude petroleum import tonnage and draft-constrained product tankers. Initial investigations suggested that a significant percentage of Texas City crude petroleum imports would immediately benefit from the 45-foot depth. Additionally, examination of the vessel sizes used for petroleum product imports and loading patterns at other Gulf Coast ports showed that up to 51 percent of product imports are transported in vessels with loaded drafts over 40 feet. Examination of Texas City's domestic coastwise petroleum product movements, in particular vessel design drafts and channel depths at trading ports, suggested that between 10 and 20 percent of domestic coastwise petroleum product tonnage would also likely utilize the Texas City 45-foot depth. Expectations concerning the relationship between the proposed 45-foot project depths and the percentage of tonnage transitioning to more fully loaded drafts are subject to a certain degree of uncertainty. Some of the major variables affecting utilization are origin of shipment and trade route. Other variables, particularly relevant in the short-term, include vessel availability and vessel operating costs. Minimization of vessel operating costs is assumed to drive long-term vessel choices.

5.6 REDUCTION IN TRANSPORTATION COST BENEFITS

The transportation costs and the savings associated with the proposed project depth increase were calculated using commodity-specific vessel class and trade route distributions. Port depth, trade route, and historical vessel utilization data were used to identify the percentage of tonnage anticipated to benefit from the Texas City proposed depth increases. Transportation costs were calculated based on the channel depth alternatives and variables associated with vessel design drafts, maximum feet of light-loading, underkeel clearance, mileage traveled, and the number of hours to load and unload.

Table 7 displays the vessel operating costs used for the transportation cost calculations. Foreign flag tankers were used to calculate the transportation costs for foreign imports of crude petroleum and petroleum product imports and exports. U.S. flag tanker costs were used for coastwise product shipments.

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[3] The issuance of the Shoal Point Container Terminal permit in 2004 and initiation of construction in 2005 will result in the introduction of containerships before the year 2010; however, the introduction of containerships with loaded drafts over 40 feet is not expected to affect plan optimization. The largest concentration of maximum loads for containerships is expected to be near 40 feet.

Table 7
Tanker Vessel Characteristics and Hourly Operating Cost
FY 2005 Double Hull Tankers (As Presented in EGM 05-01)

	Design				Hourly Tanker Cost			
Vessel	Draft	Immersion	Length	Beam	Foreign-Flag		U. S. Flag	
DWT	(feet)	Factor	(feet)	(feet)	At Sea	In Port	At Sea	In Port
20,000	29.9	78.7	497.7	79.5	$617	$475	$1,413	$1,271
25,000	32.0	90.8	531.1	85.4	$639	$490	$1,457	$1,308
35,000	35.4	112.6	585.8	95.1	$682	$520	$1,545	$1,383
50,000	39.5	141.4	649.9	106.7	$752	$570	$1,681	$1,499
60,000	41.8	158.9	685.3	113.1	$795	$600	$1,768	$1,573
70,000	43.8	175.4	716.8	118.8	$838	$630	$1,855	$1,648
80,000	45.6	191.0	745.2	124.1	$880	$660	$1,942	$1,722
90,000	47.3	205.9	771.2	128.8	$919	$687	$2,008	$1,775
120,000	51.6	247.5	838.5	141.3	$1,019	$749	$2,198	$1,928
150,000	55.2	285.4	894.8	151.8	$1,127	$820	$2,400	$2,669
175,000	57.9	315.0	935.9	159.5	$1,225	$888	$2586	$2,248
200,000	60.3	343.0	973.0	166.5	$1,318	$951	$2,766	$2,399
265,000	65.7	410.7	1,056.0	182.3	$1,555	$1,111	$3,214	$2,770
325,000	69.9	467.9	1,120.7	194.6	$1,715	$1,201	n/a	n/a

Compiled from USACE, Economic Guidance Memorandum, 05-01, October 2004.

The basic procedure used to calculate transportation costs (using a 90,000-DWT foreign flag tanker as an example) is illustrated in Table 8. Similar computations were made for appropriate distances and vessel sizes for each of the channel depth alternatives. The resulting costs per ton computations were calculated over the relevant range of vessels projected for each channel depth improvement, and the associated savings per ton were measured using the net differences in costs between the existing 40-foot channel and the depth alternative. The design draft for the 90,000 DWT vessels shown in Tables 7 and 8 differ. Table 7 shows a design draft of 47.3 feet and Table 8 shows a design draft of 43 feet. The latter draft, which better represents Texas City's fleet, was used in Texas City's transportation cost calculations. Long-term expectations based on analyses of the world fleet suggest that design drafts in the 43- to 47-foot range should be expected over the planning period. Additionally, cost analyses indicate that the effect of a Texas City channel depth of 45 feet or more will result in a greater concentration of 90,000 DWT vessels with design drafts in excess of 43 feet. An effect of channel deepening is also likely to result in a continued and increased concentration of tankers in the 100,000 to 110,000 DWT.

Table 8
Transportation Cost Calculation (Mexico to Texas City) using EGM 05-01 Vessel Costs

Vessel Characteristics and Cost Inputs		
Channel Depth	40 foot	45-foot
Vessel Deadweight Tons	90,000	90,000
Design Draft (ft)	43	43
Cargo Capacity (%) a/	95%	95%
Cargo Capacity (short tons) a/	85,500	85,500
Immersion Factor (tons per inch)	233	233
Hourly Cost at Sea (from EGM)	$919	$919
Underkeel Clearance (ft) b/	3	3
Hourly Cost in Port (from EGM)	$687	$687
Round Trip Mileage from Mexico c/	1400	1400
Speed (Knots)	15	15
Total Voyage Cost (mileage/speed)*(hourly vessel cost)	$85,773	$85,773
Other Components (Loading and Unloading and Port Time)		
Maximum Load on 40 foot Channel d/	68,724	82,704
Cost Per Ton	$1.25	$1.04
Loading/Unloading Rate (short tons/hour) e/	5,250	5,250
Hours in Port f/	30.00	30.00
Total Loading Cost at Foreign Port	$20,610	$20,610
Total Unloading Cost in Texas City	$20,610	$20,610
Total Loading and Unloading Times	$41,220	$41,220
Total Cost Per Ton and Savings Per Ton	$1.85	$1.54
and savings Per Ton		$0.31

a/ Calculated based on data outlined in National Economic Development Handbook (IWR Report 91-R-13), p. 77, November 1991, and consultation with industry.
b/ Obtained from evaluation of shipping records and consultation with vessel pilots and terminal operators.
c/ Obtained from Lloyds/Fairplay, Distance Between Ports (CD service).
d/ Based on data outlined in National Economic Development Handbook (IWR Report 91-R-13), p. 77, November 1991. Application of the procedure shown in 91-R-13 implies that it is reasonable to use the format of the equation shown below.
Estimated short tons =~ ((DWT * Maximum % Load) - (Immersion Factor * 12 inches per ton * number of feet light-loaded).
e/ Applicable rate for Texas City terminals. f/ Port time based on industry input.

5.7 CRUDE PETROLEUM IMPORTS TRANSPORTATION SAVINGS BENEFITS

Transportation savings benefits from reductions in the vessel operating costs were calculated based on the relative difference in transportation costs between the without-project and with-project conditions. Transportation costs and savings were calculated for vessels that minimize transportation costs given trade route constraints. As previously noted, long-term fleet selection will continue to reflect goals of minimizing vessel operating costs. Table 9 summarizes the transportation costs by trade route used to calculate the with- and without- project future conditions. The per ton transportation costs correspond to the least cost method of shipment associated with the particular trade route.

Table 9
Texas City Crude Petroleum Imports
Transportation Cost and Savings Calculated Using EGM 05-01
Most Likely Transportation Mode
Trade Route and Channel Depth

Channel Depth/ Trade Route	**40 ft.**	**43 ft.**	**44 ft.**	**45 ft.**	**48 ft.**	**50 ft.**
Mexico	Direct	Direct	Direct	Direct	Direct	Direct
cost/ton	$2.19	$1.93	$1.86	$1.80	$1.67	$1.61
savings/ton		$0.26	$0.33	$0.39	$0.52	$0.58
Central and South America a/	Direct	Direct	Direct	Direct	Direct	Direct
cost/ton	$4.29	$3.74	$3.61	$3.49	$3.23	$3.15
savings/ton		$0.55	$0.68	$0.80	$1.06	$1.14
Trinidad	Direct	Direct	Direct	Direct	Direct	Direct
cost/ton	$5.01	$4.47	$4.32	$4.17	$3.83	$3.66
savings/ton		$0.54	$0.69	$0.84	$1.18	$1.35
W. Africa and North Sea	Lighten	Lighten	Lighten	Lighten	Direct	Direct
cost/ton	$9.09	$9.04	$9.04	$9.04	$8.38	$7.90
savings/ton		$0.05	$0.05	$0.05	$0.71	$1.19
Middle East	Lighter	Lighter	Lighter	Lighter	Lighter	Lighter
cost/ton	$11.99	$11.92	$11.64	$11.63	$11.59	$11.59
Savings/ton		$0.07	$0.35	$0.37	$0.40	$0.40

a/ Approximately 50% of recent historical Central and South America crude petroleum came from Venezuela and nearly all remaining Central and South America tonnage came from Trinidad. The EIA's 2006 forecast for 2010-2030 shows the approximately 70% of Central and South America crude coming from Venezuela; the transportation savings calculations reflect this anticipated trend.

Review of the depths at trading ports and significant savings per ton indicate that nearly all crude petroleum from Mexico, Venezuela and Trinidad would utilize 45 feet. An increase in Texas City's channel depth allows the existing range of 90,000 to 120,000 DWT vessels to carry approximately 20 percent more cargo, and the channel depths at the ports-of-origin are equipped to facilitate this transition. Expectations concerning the percentage of Middle East and Africa movements are subject to greater uncertainty. Nearly all Middle East tonnage is lightered and nearly all West Africa crude is lightened. The logistics associated with these offshore transfers introduces higher degrees of uncertainty than with direct shipment. However, Table 9 illustrates distinct cost savings.

The savings for lightering movements results from increases in shuttle loads due to greater channel depth in Texas City. For lightering, the effect of increasing channel depths at Texas City allows for the reduction in the number of shuttles necessary to totally lighter a Very Large Crew Carrier. The savings for lightened movements results from decreases in offshore unloading time from the mother vessel to shuttles. For lightening, the mother vessel is substituting offshore unloading time for dock-side unloading time. Additionally, the shuttle vessel reduces its overall loading and unloading time. Lightening generates comparatively lower savings than lightering because the latter produces the possibility of reducing the number of shuttles needed.

Table 10 displays comparison of the percentage distribution of crude petroleum tonnage by trade route for the existing 40-foot project depth and the project future defined by channel deepening. The shift to larger vessels is generally anticipated to take place under both the without- and with project future conditions. Table 11 summarizes the annual transportation cost savings by channel depth. Again, the transportation cost savings were calculated based on the least cost shipping methods displayed in Table 9.

Table 10
Texas City Percentage of Crude Petroleum Import Tonnage by Vessel DWT Class
Existing Conditions and 2010-2060 Future Conditions *

	Direct Shipments						Lightering	
	Mexico		South America		Europe/Africa/Med		Shuttle Vessels	
DWT	Existing	Future	Existing	Future	Existing	Future	Existing	Future
60000	5.0%	0.0%	8.0%	0.0%	0.0%	0.0%	0.8%	0.0%
80000	6.0%	5.0%	10.0%	10.0%	0.0%	0.0%	3.7%	4.5%
90000	22.0%	24.5%	12.0%	14.5%	0.0%	0.0%	27.4%	27.4%
100000	14.0%	17.4%	68.0%	70.5%	0.0%	0.0%	22.0%	22.0%
110000	47.3%	47.3%	0.0%	5.0%	0.0%	0.0%	38.6%	38.6%
120000	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
135000	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%
>=150000	5.6%	5.6%	2.0%	0.0%	100.0%	100.0%	6.7%	6.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* The existing condition distribution is based on recent historical data. The existing distribution represents cost effective vessel size choices and, therefore, is assumed to generally represent the without project future. The future condition is expected to represent the with project future. Vessel size determinations were based on an increased concentration of the most cost effective vessel sizes.

TABLE 11
Texas City Crude Petroleum Imports
Annual Transportation Savings ($1,000's)
by Representative Trade Route and Decade
Channel Depth Alternative, Year, and Representative Origin
Calculated Using EGM 05-01

43-foot Channel	2000-04	2010	2020	2030	2040	2050	2060
Mexico	$1,112	$1,146	$1,325	$1,668	$1,843	$2,036	$2,249
Central/South America	$2,909	$3,667	$4,891	$6,137	$6,779	$7,488	$8,271
Trinidad	$1,730	$2,350	$3,245	$3,965	$4,380	$4,838	$5,344
Europe & Africa	$504	$573	$668	$821	$907	$1,002	$1,107
Middle East	$1,060	$1,249	$1,479	$1,833	$2,025	$2,237	$2,471
Total Savings	7,315	8,985	11,608	14,424	15,934	17,601	19,442

44-foot Channel	2000-04	2010	2020	2030	2040	2050	2060
Mexico	$1,412	$1,455	$1,681	$2,117	$2,339	$2,584	$2,854
Central/South America	$3,597	$4,534	$6,046	$7,587	$8,381	$9,258	$10,226
Trinidad	$2,211	$3,003	$4,147	$5,066	$5,596	$6,182	$6,829
Europe & Africa	$504	$573	$668	$821	$907	$1,002	$1,107
Middle East	$4,998	$5,888	$6,976	$8,066	$8,910	$9,842	$10,872
Total Savings	12,722	15,453	19,518	23,657	26,133	28,868	31,888

45-foot Channel	2000-04	2010	2020	2030	2040	2050	2060
Mexico	$1,669	$1,719	$1,987	$2,502	$2,764	$3,054	$3,373
Central/South America	$4,232	$5,334	$7,114	$8,926	$9,860	$10,891	$12,031
Trinidad	$2,691	$3,656	$5,048	$6,168	$6,813	$7,526	$8,313
Europe & Africa	$504	$573	$668	$821	$907	$1,002	$1,107
Middle East	$5,231	$6,162	$7,301	$8,442	$9,325	$10,301	$11,379
Total Savings	14,327	17,444	22,118	26,859	29,669	32,774	36,203

48-foot Channel	2000-04	2010	2020	2030	2040	2050	2060
Mexico	$2,225	$2,293	$2,649	$3,337	$3,686	$4,071	$4,497
Central/South America	$5,607	$7,068	$9,425	$11,827	$13,064	$14,431	$15,941
Trinidad	$3,780	$5,136	$7,092	$8,664	$9,571	$10,572	$11,678
Europe & Africa	$7,928	$9,002	$10,491	$11,663	$12,884	$14,232	$15,720
Middle East	$5,727	$6,747	$7,994	$9,243	$10,210	$11,278	$12,458
Total Savings	25,267	30,246	37,651	44,734	49,415	54,584	60,294

50-foot Channel	2000-04	2010	2020	2030	2040	2050	2060
Mexico	$2,482	$2,557	$2,955	$3,722	$4,111	$4,541	$5,016
Central/South America	$6,031	$7,601	$10,137	$12,720	$14,050	$15,520	$17,144
Trinidad	$4,325	$5,876	$8,113	$9,912	$10,949	$12,095	$13,360
Europe & Africa	$12,854	$14,595	$17,011	$19,681	$24,015	$24,015	$26,528
Middle East	$5,738	$6,759	$8,009	$9,260	$10,229	$11,299	$12,481
Total Savings	$31,430	$37,388	$46,225	$55,295	$63,354	$67,470	$74,529

5.8 PETROLEUM PRODUCT TRANSPORTATION SAVINGS BENEFITS

Reductions in the vessel operating costs for Texas City's foreign petroleum product imports, exports and coastwise shipments were calculated based on the relative difference in transportation costs between the without-project and with-project conditions. As with crude petroleum, transportation costs and savings were calculated for vessels that minimize transportation costs given trade route constraints. Again, long-term fleet selection will continue to reflect goals of minimizing vessel operating costs.

Table 12 summarizes the annual transportation savings benefits for petroleum product imports and exports. Determination of the percentage of product imports and exports likely to utilize vessels with loaded drafts over 40 feet was based on examination of the recent historical load patterns and channel depth constraints at trading ports. The median design draft for Texas City parcels of 45,000 or more was approximately 45 feet for imports and 44 feet for exports. For purposes of analysis, estimation of the future percentage of cargo anticipated to load to drafts over 40 feet was made based on historical volumes associated with parcels larger than 60,000 short tons and vessel design drafts over 40 feet, along with trade route limitations. The historical data exhibits variance and future expectations are for continued variance. In spite of uncertainties, Texas City's 2000-2004 product carrier utilization record, with nearly 70 percent of imports and over 40 percent of exports moving in maximum-design draft vessels over 40 feet, and world vessel fleet trends showing increasing availability of tankers between 90,000 and 114,999 DWT suggests that some product carriers will likely utilize channel depths over 40 feet. In comparison to crude petroleum, product tonnage volumes will recognizably continue to represent a relatively small portion of total tonnage. Products represented 15 percent of 2000-2003 total ocean-going petroleum tonnage and, for purposes of analysis, are anticipated to maintain a relatively constant share.

Examination of trade route constraints, parcel sizes, and discussion with shipping industry representatives suggested that 38 percent of imports and 14 percent of exports would benefit from depths between 41 and 45 feet. Table 13 displays data pertinent to Texas City's foreign product movements. While the presentation indicates that nearly 80 percent of 2003-2005 imports and 26 percent of exports are associated with design drafts in excess of 40 feet, some tonnage faces port draft-restrictions, including the Panama Canal and are not presently loaded to drafts over 35 feet. Completion of the Panama Canal improvements will allow vessels with loaded drafts up to 47 feet to transit. Presently, vessels from the Far East and the west coasts of North and South America are restricted to loaded drafts of 39.6 feet. Determination of the percentage of product imports and exports likely to utilize vessels with loaded drafts over 40 feet was based on examination of the recent historical load patterns and channel depth constraints at trading ports.

Table 12
Texas City Petroleum Product Imports and Exports
Annual Transportation Savings ($1,000)
by Representative Trade Route and Decade
Calculated Using EGM 05-01

Trade Route and Year	2001-03	2010	2020	2030	2040	2050	2060
Europe and Africa (65%)		**43-foot Channel Imports Transportation Cost**					
Latin America (35%)	$727	$973	$1,274	$1,449	$1,649	$1,876	$2,134
		43-foot Channel Exports Transportation Cost					
(75% Europe/25% Brazil)	$139	$150	$158	$164	$170	$177	$184
Total Savings	$866	$1,123	$1,432	$1,614	$1,819	$2,053	$2,318
Europe and Africa (65%)		**44-foot Channel Imports Transportation Cost**					
Latin America (35%)	$951	$1,271	$1,662	$1,891	$2,152	$2,448	$2,786
		44-foot Channel Exports Transportation Cost					
(75% Europe/25% Brazil)	$179	$193	$203	$211	$219	$228	$237
Total Savings	$1,130	$1,464	$1,865	$2,102	$2,371	$2,676	$3,023
Europe and Africa (65%)		**45-foot Channel Imports Transportation Cost**					
Latin America (35%)	$1,148	$1,534	$2,005	$2,282	$2,596	$2,954	$3,361
		45-foot Channel Exports Transportation Cost					
(75% Europe/25% Brazil)	$216	$233	$245	$255	$265	$275	$286
Total Savings	$1,364	$1,767	$2,250	$2,537	$2,861	$3,229	$3,647
Europe and Africa (65%)		**48-foot Channel Imports Transportation Cost**					
Latin America (35%)	$1,662	$2,222	$2,907	$3,307	$3,763	$4,281	$4,871
		48-foot Channel Exports Transportation Cost					
(75% Europe/25% Brazil)	$314	$338	$356	$369	$384	$399	$414
Total Savings	$1,976	$2,560	$3,263	$3,676	$4,147	$4,680	$5,285
Europe and Africa (65%)		**50-foot Channel Imports Transportation Cost**					
Latin America (35%)	$1,662	$2,222	$2,907	$3,307	$3,763	$4,281	$4,871
		50-foot Channel Exports Transportation Cost					
(75% Europe/25% Brazil)	$314	$338	$356	$369	$384	$399	$414
Total Savings	$1,976	$2,560	$3,263	$3,676	$4,147	$4,680	$5,285

Table 13
Texas City Petroleum Product, 2000-2005
Percentage of Imports and Exports by Vessel DWT

DWT Range	Design Draft (ft)	2000	2001	2002	2003	2004	2005
		Texas City Petroleum Product Imports					
Less than 47,999	37	23.3%	20.9%	19.2%	24.2%	14.7%	27.0%
47,999 to 59,999	42	21.1%	6.5%	4.0%	0.0%	0.7%	2.0%
60,000 to 69999	44	42.8%	43.7%	33.1%	43.9%	20.3%	21.5%
70,000 to 79,999	46	0.8%	4.9%	5.4%	24.8%	22.2%	23.2%
80,000 to 89,999	42	1.4%	5.0%	7.0%	4.8%	4.6%	12.6%
90,000 to 99,999	47	3.9%	6.5%	11.0%	0.0%	15.7%	0.0%
100,000 to 119,999	49	6.7%	12.5%	20.3%	2.2%	13.6%	9.4%
120,000 to 160,000	n/a	0.0%	0.0%	0.0%	0.0%	8.3%	4.3%
Total		100.0%	100.0%	100.1%	100.0%	100.0%	100.0%
		Texas City Petroleum Product Exports a/					
Less than 47,999	38	41.1%	42.3%	80.3%	81.1%	56.3%	85.4%
47,999 to 59,999	43	28.3%	8.3%	0.0%	0.0%	0.0%	2.4%
60,000 to 69999	43	20.6%	15.3%	7.7%	10.1%	7.0%	4.3%
70,000 to 79,999	45	0.0%	0.0%	0.0%	0.0%	0.0%	7.5%
80,000 to 89,999	48	6.0%	8.6%	0.0%	0.0%	12.6%	0.2%
90,000 to 99,999	45	4.0%	7.6%	12.0%	8.7%	0.0%	0.0%
100,000 to 119,999	47	0.0%	17.9%	0.0%	0.0%	12.5%	0.0%
120,000 to 160,000	54	0.0%	0.0%	0.0%	0.0%	11.5%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Compiled from U.S. Army Corps of Engineers, Navigation Data Center detailed records.
a/ Excludes Petroleum Coke.

Table 14 summarizes the benefit calculations for coastwise product shipments. Examination of Texas City's 2001-03 coastwise petroleum product vessels showed that approximately 10 percent of outbound coastwise shipments were transported in draft- restricted tankers. The largest product carriers generally are between the 60,000 and 80,000 DWT and the design drafts in the 41 to 43-foot range. Additionally, 35.9 percent of 2001-03 coastwise products were transported in vessels with loaded drafts over 36 feet. The vessels used are all U. S. flag vessels, Jones' Act vessels. The median age of the current fleet exceeds 10 years, with most vessels built in the mid-nineteen eighties. It is expected that the eventual replacement fleet will generate a higher concentration of slightly larger vessels. Additionally, it is expected that the design drafts for new vessel orders will in the 40- to 43-foot range. Review of "vessels on order records" for U.S. tankers showed several new orders for vessels in the 60,000 to 80,000 DWT range. The majority of the current draft-constrained tankers were outbound movements of gasoline from Texas City to Port Everglades, Florida. Port Everglades has a channel depth of 42 feet and more fully loaded vessels could be accommodated. In addition to Port Everglades, there are several other U. S. East Coast ports at depths between 42 and 45 feet, with New York Harbor presently authorized to 50 feet. General indicators associated with U. S. port depth trends and eventual vessel replacement expectations suggest that 10 percent of Texas City coastwise tonnage would utilize loaded depths of 42 feet by the year 2010 given channel depth availability in Texas City. It is not unreasonable to assume that the expected 10 percent estimate would increase to 20 percent by year 2020.

Table 14
Petroleum Product Coastwise Shipments
Vessel Data, Base Tonnage, and Transportation Savings Benefit Summary
EGM 05-01 Vessel Costs

Origin-Destination Data

Shipments to Pt Everglades from Texas City
Initial % of total outbound shipments: 10.0%
Round trip mileage: 2,450

Vessel Input Data and Transportation Cost

Channel Depth (ft)	Design Draft (ft)	Vessel DWT	No. of feet Light-Loaded	Cargo by Channel Depth	Round Trip Voyage Cost	Loading and Unloading Cost	Tug Cost	Total Cost	Cost Per Ton
40	43	45000	6	30,871	$272,541	$16,947	$7,319	$296,807	$9.61
45	43	45000	2	37,890	$272,541	$20,800	$7,422	$300,763	$7.94
								Saving/ton	$1.68

Texas City Domestic Coastwise Petroleum Product Tonnage

Year	Total Short Tons	Short Tons Used for Benefits
2001	4,590,136	459,014
2002	3,091,890	309,189
2003	3,962,795	396,280
2001-03 Average		388,161
% of Total		10%

Texas City Domestic Coastwise Petroleum Product Annual Transportation Benefits

Year	Total Tonnage	Used for Benefits	Percentage Used for Benefits	Annual Savings
2001/03	3,881,607	388,161	10%	$650,858
2010	4,304,147	430,415	10%	$721,709
2020	4,897,580	979,516	20%	$1,642,429
2030	5,572,833	1,114,567	20%	$1,868,878
2040	6,341,186	1,268,237	20%	$2,126,549
2050	7,215,475	1,443,095	20%	$2,419,746
2060	8,210,307	1,642,061	20%	$2,753,368

5.9 SUMMARY

Texas City's historic traffic was initially evaluated to identify the percentage of tonnage currently or anticipated to be limited by the constraints of the existing and the without-project future channel dimensions. Within the context of this framework, channel constraints were defined to exist when a percentage of the tonnage associated with a commodity group is currently or anticipated to be transported in vessels that cannot be fully loaded. The historic data clearly showed that a significant share of the vessels used in the transport of crude petroleum could be loaded to depths over 40 feet. In addition, but to a lesser extent, examination of the 1998-03 vessels sizes, loaded drafts, design drafts, and parcel sizes revealed that vessels used to transport petroleum products are constrained by the existing 40-foot channel depth. A more detailed discussion of Texas City's long-term historical trends and evaluation of forecast indicator are contained in the Economic Appendix. Table 15 summarizes the annual transportation saving benefits by channel depth alternative.

Table 15
Transportation Savings ($1000) by Channel Depth and Commodity Group
Calculated Using EGM 05-01

			Crude Petroleum Imports		
			Transportation Savings by Channel Depth 2010-2060		
Year	43	44	45	48	50
2010	$8,985	$15,453	$17,445	$30,245	$37,389
2020	$11,607	$19,518	$22,117	$37,651	$46,224
2030	$14,424	$23,658	$26,859	$44,734	$55,295
2040	$15,933	$26,133	$29,670	$49,415	$63,355
2050	$17,600	$28,867	$32,774	$54,584	$67,470
2060	$19,442	$31,888	$36,203	$60,295	$74,529
			Average Annual Benefits (50-Year Period of Anaysis at 4.875%)		
2010-60	$12,743	$21,232	$24,067	$40,640	$50,418
			Petroleum Product Import and Export Tonnage (Includes Coastwise Domestic)		
			Transportation Savings by Channel Depth 2010-2060		
Year	43	44	45	48	50
2010	$1,845	$2,186	$2,489	$3,282	$3,282
2020	$3,075	$3,508	$3,893	$4,905	$4,905
2030	$3,482	$3,971	$4,406	$5,546	$5,546
2040	$3,946	$4,498	$4,988	$6,273	$6,273
2050	$4,472	$5,096	$5,649	$7,100	$7,100
2060	$5,071	$5,776	$6,401	$8,038	$8,038
			Average Annual Benefits (50-Year Period of Analysis at 4.875%)		
2010-60	$3,125	$3,583	$3,991	$5,060	$5,060
			Total Average Annual Benefits (50-Year Period of Analysis at 4.875%)		
Total	$15,868	$24,815	$28,058	$45,700	$55,477

The purpose of the analyses was to determine if the net excess benefits from deepening the existing 40-foot channel to 45 feet exceeded those for channel depth alternatives less than 45 feet. Benefits were calculated for channel depth alternatives of 43, 44, 45, and 48 feet. The 43-foot depth was evaluated to help determine if net excess benefits maximized at a depth less than 44 or 45 feet and to determine the change in transportation costs at the 1-foot increment. The 48-foot depth was included to determine the magnitude of increased savings at depths over 45 feet. The results of the preliminary analysis showed that economies of scale realized from larger cargo loads generated higher benefits at deeper channel depths. Table 16 compares the benefits and costs of the various alternatives, as well as the authorized 50-foot project.

TABLE 16
Comparison of Alternatives
Discount Rate 4.875% and $1,000
Calculated Using EGM 05-01 (using $1.19 fuel cost)
and October 2005 Construction Cost

Channel Depth (ft):	43	44	45	48	50
First Cost of Construction	$34,219	$42,446	$52,652	$107,087	$145,065
Period of Construction	24	24	24	48	60
Interest During Construction Period	$1,647	$2,043	$2,535	$10,890	$18,833
Non-Federal Associated Cost	$2,217	$2,439	$2,683	$2,951	$3,246
Archaeology Mitigation Cost	$1,108	$1,108	$1,108	$1,108	$1,108
Total Project Construction Cost	$39,191	$48,036	$58,978	$122,036	$168,252
Average Annual Construction Cost	$2,105	$2,581	$3,168	$6,556	$9,039
Average Annual O&M Incremental Cost	$139	$139	$139	$2,000	$4,000
Total Average Annual Cost	$2,244	$2,720	$3,307	$8,556	$13,039
Average Annual Benefits	$15,868	$24,815	$28,058	$45,700	$55,477
Net Excess Benefits	$13,623	$22,095	$24,750	$37,144	$42,439
BCR	7.1	9.1	8.5	5.3	4.3

6.0 ENGINEERING STUDIES

6.1 HYDRODYNAMIC STUDY

Astronomical tide induced currents, wind induced circulation density related currents and freshwater inflows are major factors that would influence salinity and circulation in the bay. The experimental conditions used for hydrodynamic study were created for the Houston-Galveston Navigation Channels hydrodynamic study by Berger et al.1995. Details on these conditions are presented in the technical report entitled "Houston-Galveston Navigation Channels, Texas Project, Report 3 Three Dimensional Hydrodynamic Verification", Technical Report HL-92-7 and in a resulting report titled "Texas City Channel Deepening Study, Hydrodynamic Model" was developed by Lisa M. Lee, Jennifer N. Tate, and R. C. Berger in August 2005. Tides in Galveston Bay are predominantly diurnal; the mean tide range is about 1.6 feet at the entrance of the bay, decreasing to 1.00 foot or less near Baytown. A hydrodynamic model study was performed to obtain currents for the existing and with project conditions.

The ebb for the improved condition showed a slight increase in current speed within the channel near the added berthing area but a slight decrease in the currents in the berthing area. For the flood conditions the greatest difference occurred when the turning basin and berthing areas were added. The approach to the Texas City Channel in Bolivar Roads showed a slight increase in current speed.

The primary goal of this study was to provide currents for the ship simulator for maximum flood and ebb for both the existing and project conditions. The verification was performed to ensure the model was behaving in the same manner as for the previous study. It was found that changes did not have a major effect on the maximum velocities at either the maximum flood or ebb condition.

6.2 SHIP SIMULATION

To properly evaluate screened alternative depths, a ship simulation was performed in accordance with the requirements of Engineering Regulation No. 1110-2-1403 – "Engineering and Design, Studies by Coastal, Hydraulic, and Hydrologic Facilities and Others" to ensure the safety of the projected vessel traffic in the Texas City Channel. The study was conducted at ERDC-CHL in Vicksburg, Mississippi. The report is dated October 2005. The study objective was to model vessel traffic in the proposed 45-foot deep channel with no increase to bottom width.

Vessels used in the simulation, three tankers and a container ship, ranged from 895 to 1,140 feet in length; 140- to 156-foot beam widths; and 27- to 44-foot drafts. The vessels were selected based on discussion with the Non-Federal Sponsor and the Pilots' Association. The simulation was validated with the assistance of licensed pilots for the Texas City Channel. The channel was defined using bank conditions, currents, visual scene and radar image of the study area, location of all aids to navigation, location and orientation of existing docks, location of buildings visible from the vessel, and the location of the planned Shoal Point Terminal, including the location of the new berthing area and the turning basin. To validate the reaction of the vessel to bank forces, several simulation runs were made with the vessel transiting the entire study area. Several simulation runs were made using the existing and alternative channel configurations. The wind speed ranging from 0 to 25 knots and current speed from 0 to 14 knots in different combination were used for the runs and pilots' responses were noted. The simulation of the vessels did not indicate any major problem with the channel design.

The tankers were observed to have encountered some problem in negotiating the curve at channel Station 20+500. The simulation runs show that while the vessel is already out of the effect of most of the current in the channel, a wind from the south will force the pilot to compensate and end up close to the south edge of the channel. For this reason, the curve is recommended to be widened by at least 50 feet.

7.0 PLAN SELECTION

7.1 OVERVIEW

Based on the economic, engineering and environmental factors considered, the selected plan includes deepening the Texas City Turning Basin and Texas City Channel from the Turning Basin to the channel junction with the HSC to -45-feet MLT. A total of approximately 4.8 million cubic yards (mcy) of construction and maintenance grade material would require separate dredging contracts to complete. The work is estimated to begin in 2008 and be complete by 2010. Dredged material management will be performed according to the Dredged Material Management Plan (DMMP) described in Section 7.3.

7.2 GENERAL NAVIGATION FEATURES OF THE SELECTED PLAN

Texas City Turning Basin and Industrial Canal
The Industrial Canal is 250 feet wide by 1.7 miles long and is authorized to - 40 feet. The Industrial Canal will not be improved at this time. The Turning Basin is 1,000 feet wide by 1,150 feet long and will be deepened to -45 feet with two foot advanced maintenance and 1 foot allowable over depth. Approximately 0.9 mcy of construction and maintenance grade material will be dredged from the turning basin.

Texas City Channel
The channel from the Texas City Turning Basin to Bolivar Roads (Station 1+493 to Station 37+429.99) is 400 feet wide by 6.75 miles long and will be deepened to -45 feet with the currently approved practice of an additional three foot advance maintenance and two foot allowable over depth. Incidental widening for easing a bend and making the channel more linear is necessary between Station 19+339.69 to Station 21+716.78 based on the results of ERDC's Ship Simulation Report. This will allow pilots to have an easier time navigating the bend in this area of the channel. Approximately 4.8 mcy of construction (new work material) and maintenance grade material will be used to construct and fill beneficial use sites.

Texas City Dike
The Texas City Dike is an integral feature of the navigation channel in that it shelters the channel from northerly wind waves and currents. Not only does the dike calm the water from these waves and currents, thereby facilitating safe navigation, it abates shoaling of the channel from the north. Areas along the north side of the dike also serve as PAs for sandy maintenance material. Two PAs currently exist and a third will be utilized for this project. The placement plan is described in the DMMP in Section 7.3. Two secondary hydraulic-fill finger groins are planned for the north side of the dike near its eastern tip to retain maintenance material when it is placed behind the groins. The groins should reduce the transport of sediments back into the channel.

Dredged Material PAs

The Shoal Point PA (SPPA) is the only confined (leveed) upland PA used for maintaining the Texas City Channel. This PA was originally about 700 acres in size, but has since (in 2005) been scaled down and reconfigured into two relatively small-sized PAs that are adjacent to each other, PA 5 and PA 6, separated by an access road corridor (Figure 4). PA 5 is approximately 126 acres in size. PA 6 is approximately 75 acres. The former 700-acre PA provided about half the storage capacity needs for channel maintenance; the other half being the areas along the north side of the Texas City Dike (PAs 2A and 2B).

Six semi-confined placement areas would be constructed adjacent to or just offshore of the southeast side of the existing SPPA including SPPA 1, 1A, 2, 3, 4 and 5. SPPA 1 and 1A will be constructed by the City of Texas City in fulfillment of their USACE Permit requirements. SPPA 2, 3, 4 and 5 will be constructed as part of the Federally funded channel deepening project and would eventually be converted to emergent marsh. The Pelican Island PA, would be constructed adjacent to the western side of Pelican Island and would be constructed during one dredging cycle. New work material will be utilized for levee construction for the PAs in open water. The PAs would then be filled with maintenance material over time and would eventually be converted to emergent marsh. Although 1,086 acres of bay bottom will be impacted, the resulting marsh will provide beneficial habitat for aquatic resources. No wetlands will be impacted and no other natural resources will be adversely impacted; therefore no mitigation is required. All PAs are summarized in Table 17.

Table 17
Placement Area Summary

Placement Area	Type/Location	Size (acres)
PA5	Existing upland site/on Shoal Point	126
PA6	"	75
SPPA 1*	New open water site/adjacent to Shoal Point	357
SPPA 1A*	"	
SPPA 2	"	156
SPPA 3	"	469
SPPA 4	"	
SPPA 5	"	
Pelican Island PA	New open water site/adjacent to Pelican Island	104
PA 2A	Existing open water site/north side of TX City Dike	75
PA 2B	"	75
PA 2C	New open water site/north side of TX City Dike	75

* to be constructed by the Non-Federal Sponsor

Mitigation

No mitigation is required for the project. No wetlands will be impacted by the project. During the coordination efforts for the SPCT permit, development of the DMMP was fully coordinated and agreed upon by the resource agencies. Although 1,086 acres of bay bottom will be impacted, the bay bottom will be replaced by 999 acres of emergent marsh, benefiting fisheries and the aquatic environment. Therefore, mitigation is not required.

7.3 DREDGED MATERIAL MANAGEMENT PLAN (DMMP)

The decision was made at the start of the reevaluation process to utilize the DMMP that was developed during the EIS for the Shoal Point Container Terminal USACE permit. The DMMP was thoroughly coordinated with local resource agencies, industry groups, the general public, and the civil works side of USACE Galveston District. The plan was ultimately approved by the EPA and Texas State agencies that have authority over Section 401 of the Clean Water Act and coastal zone management issues. It was determined that the size and locations of the placement cells were the most environmentally and logistically sound for material dredged from the Texas City Channel. The creation of upland PAs in open bay waters was not considered to be environmentally acceptable. The PAs were sized, shaped and located so that environmentally sensitive areas were avoided (primarily oyster beds). The plan ultimately includes the conversion of the placement cells to emergent marsh, therefore utilizing the dredged material beneficially.

During this reevaluation, the DMMP was evaluated according to USACE requirements regarding costs, required capacity for dredged material for the project, and engineering requirements. It also included a reevaluation of potential upland sites for placement of material. Most surrounding upland areas are developed as commercial properties. Three small non-contiguous tracts were located. However, the pump distance to those sites is approximately 10 miles. Pumping 4.8 mcy of new work material over a distance of 10 miles at a cost of $12.00 per cy is approximately $57.6 million. Pumping 43.6 mcy of maintenance material at $6.00 per cy would be approximately $304 million. These costs do not include real estate costs to secure the land and costs to prepare the uplands to receive dredged material. The closest large tract of land (Virginia Point) contains wetlands and was recently purchased as a wetland preserve.

The only other option for placement of material would be offshore disposal with a cost estimate of $98 million for transporting the new work material offshore and $626 million over the 50 year period of analysis for the transportation of maintenance material to an offshore location.

Both upland and offshore placement are cost prohibitive. The DMMP that was approved in the USACE permit, with some minor modifications, is the base plan for the current Federal project reevaluation study.

Minor modifications to the DMMP that were approved in the USACE permit have been made. The footprint for the placement of material will remain the same, except for the additional PA north of the Texas City Dike. The modifications primarily include the sequencing of the placement of material. The most prominent sequencing change is that the construction of the levees for BUS1 (re-named SPPA1 and 1A) that are the responsibility of the City will be completed in two phases. The levees of SPPA2 will be constructed as part of the Federal project and will be constructed at the same time as SPPAs 3, 4 and 5. The general assumption was made that SPPA1 (95 acres) will be constructed by the City first, then SPPA2 will be constructed by the Federal project and SPPA1A (262 acres) constructed by the City will follow. If SPPA1 is not constructed by the time the Federal project is initiated, then SPPA2 will be constructed adjacent to PA6. The City will then construct SPPA1 and SPPA1-A.

Deepening and incidental widening of the Texas City Channel and Turning Basin will generate approximately 4.8 mcy of new work material and 43.6 mcy of maintenance material over the 50 year period of economic evaluation.

There are six semi-confined open water PAs, SPPA 1 thru 5 and Pelican Island PA, two reconfigured upland PAs on Shoal Point, PA5 and PA6, and two existing and one new open-water PAs on the north side of the Texas City Dike. As mentioned above, the City of Texas City, the Non-Federal Sponsor, is responsible for the construction of SPPA1 and 1-A, as a result of their DA permit requirements. Most new work material removed during channel deepening will be used to construct the perimeter levees for SPPAs 2, 3, 4 and 5 and the Pelican Island PA. The scheduled implementation plans for the placement of dredged material (new work and maintenance) are shown in Tables 18 and 19. Although the PAs will also be utilized by the Shoal Point Container Terminal Project for placement of material, Table 19 includes only the quantities of material from the Federal channel deepening project. Ultimately, SPPAs 1 through 5 and the Pelican Island PA will be converted to emergent marsh, thereby utilizing the dredged material in a beneficial manner.

Table 18
New-Work Dredging Quantities by Material Type

Reach	Construction-Grade (virgin, cy)	Maintenance-Grade (new-work, cy)	Maintenance (shoal, cy)	Total (cy)	Notes
1	172,000	618,000	125,000	915,000	To be placed in PAs 5 and 6.
2	2,364,000	0	710,000	3,074,000	To be placed as hydraulic fill for levee construction at SPPAs 2, 3, 4, and 5
3	256,000	0	94,000	350,000	To be placed as hydraulic fill to construct groins "A" and "B" and other fill at Texas City Dike.
4	491,000	0	19,000	510,000	To be placed as hydraulic fill for perimeter levee for Pelican Island PA
		Total Material, Federal Contract Dredge:		**4,849,000**	

Table 19 50-Year Dredged Material Management Plan Summary										
Project Year	**Maintenance Material Quantities (cy)**									
	PA 2A-2C	**PA 5-6**	**SPPA 1**	**SPPA 1A**	**SPPA 2**	**SPPA 3**	**SPPA 4**	**SPPA 5**	**PIPA**	**Total**
1		970,000*								970,000
2										
3	1,170,000	350,000	558,000							2,078,000
4										0
5	970,000	350,000	89,000		469,000				200,000	2,078,000
6										0
7	1,170,000	350,000			558,000					2,078,000
8										0
9					558,000					558,000
10	1,170,000	350,000								1,520,000
11			50,000		151,000	357,000				558,000
12										
13	1,170,000	350,000				558,000				2,078,000
14										0
15				189,000		369,000				558,000
16	1,170,000	350,000								1,520,000
17				238,000		320,000				558,000
18										0
19	1,170,000	350,000		508,000	50,000					2,078,000
20										0
21	1,170,000	350,000		558,000						2,078,000
22										0
23				508,000		50,000				558,000
24	1,170,000	350,000								1,520,000
25				324,000			234,000			558,000
26										0
27	1,170,000	350,000					558,000			2,078,000
28										0
29	1,170,000	350,000					474,000	84,000		2,078,000
30										0
31								558,000		558,000
32	1,170,000	350,000								1,520,000
33								558,000		558,000
34										0
35	1,170,000	350,000		50,000				508,000		2,078,000
36										0
37		204,000						354,000		558,000
38	1,170,000	350,000								1,520,000

39		658,000								658,000
40										0
41	1,170,000	908,000					50,000			2,128,000
42										0
43	1,170,000	958,000								2,128,000
44										0
45	1,170,000	958,000								2,128,000
46										0
47	1,170,000	958,000								2,128,000
48										0
49	1,170,000	908,000						50,000		2,128,000
50										
Sub-total	22,030,000	11,422,000	697,000	2,375,000	1,786,000	1,654,000	1,316,000	2,112,000	200,000	43,592,000
									Total Quantities	43,592,000

* Maintenance-grade Material from deepening of Texas City Turning Basin

7.4 REAL ESTATE REQUIREMENTS

This project has no lands, easements, rights-of-way, or relocation (LERR) costs or costs for removal of pipelines. Two pipelines within the project area are at a sufficient depth so as not to be affected by the dredging and 1 abandoned pipeline is scheduled for removal by others prior to construction. The removal is a Section 10 permitted facility and is not part of LERRD and not part of the local sponsor responsibility. The Corps regulatory office will pursue removal per the terms of the permit at no cost to the project. All proposed sites identified as open water PAs, whether new or existing, are within the federal government's navigational servitude rights and therefore no additional land interests need to be acquired.

No additional real estate is required for this project. All of the excavated material will be deposited within and or redistributed within the navigable waterways within the Navigational Servitude and jurisdiction of the Government. This will include the creation of five (5) marsh sites, which will be located within the navigable waters of the United States. Detailed information concerning real estate requirements can be found in Real Estate Plan Appendix B.

8.0 AFFECTED ENVIRONMENT

8.1 OVERVIEW

In November 2002 an EIS was completed for USACE Permit No. 21979 for the SPCT, including the deepening of the Texas City Channel to 45 feet. This assessment incorporates, by reference, data and information that pertain to the Texas City Channel Deepening Project from the Shoal Point Container Terminal EIS. 33 CFR 230.21 provides authorization for the district commander to adopt a Federal agency's EIS in full or partial compliance of NEPA. The EIS disclosed all environmental impacts associated with the proposed channel deepening for the permit action. The deepening impacts for the permit action are the same for the current Federal proposal to deepen the channel to 45 feet. For this reason an environmental assessment was prepared instead of an EIS. Impacts of proposed Federal project features that were not included in the EIS including deepening the existing turning basin, bend easing, and the new PA and groins on the north side of the Texas City Dike are fully disclosed and evaluated in this document. This Environmental Assessment (EA) has been prepared consistent with the provisions of 33 CFR 230.7(b) since the project changes may be approved under the discretionary authority of the Secretary of the Army. In addition, any environmental or regulatory changes that have occurred since the completion of the November 2002 EIS are presented. Environmental consequences are discussed in Section 9.0.

8.2 ENVIRONMENTAL SETTING OF THE STUDY AREA

Physical Characteristics
The Texas City Channel Deepening Project is located in Galveston Bay, an estuary where freshwater flows meet and mix with the salt water of the Gulf of Mexico (Figure 3). The bay is approximately 600 square miles in surface area, and is generally shallow, with typical water depths in the interior of the bay ranging from 5 to 12 feet. Dredged navigation channels, with depths ranging from 12 to 45 feet, transect the bay system. Galveston Bay consists of several subsystems: Trinity Bay, East Bay, the confined portion of the HSC above Morgan's Point, San Jacinto Bay, upper Galveston Bay (the area north of the Texas City Dike) and West Bay that includes the Texas City Channel project area.

An important feature in the bay system is the Texas City Dike along the west shore of Galveston Bay. This structure, which has existed in the bay system in various forms since 1915, exerts an influence on the currents in the Bolivar Roads area and reduces the exchange of water between Galveston Bay and West Bay. At the same time, it reduces currents and sedimentation in the Texas City Channel. The channel is one of nine main navigation channels in the Galveston Bay complex. A detailed discussion of the area's physical characteristics can be found in Section 3.0 of the EIS.

Air Quality
The Clean Air Act (CAA), which was last amended in 1990, regulates air emissions from area, stationary, and mobile sources, and requires the EPA to set air quality standards for pollutants considered harmful to public health and the environment. Currently, there are air quality

standards for six "criteria" pollutants designated by EPA; carbon monoxide, nitrogen dioxide, ozone, lead, sulfur oxides, and inhalable airborne particulate matter.

The Houston-Galveston-Brazoria area (HGB), consisting of Montgomery, Liberty, Chambers, Galveston, Brazoria, Fort Bend, and Waller Counties, fails to meet the EPA air quality standards for ozone. As a result, the HGB has been classified as a "moderate" non-attainment area for the EPA 8-hour standard for ozone. Under current regulations, the HGB has until 2010 to attain the EPA standard for ozone. In an ozone non-attainment area classified as moderate, if the total emissions of either nitrogen oxides (NOX) or volatile organic compounds (VOCs) related to the Federal action would equal or exceed 100 tons per year, the Federal agency must issue a General Conformity Determination. The determination must state how the project conforms or will conform to the State Implementation Plan (SIP) for that pollutant, before undertaking the action. Results of the Formal Air Conformity Analysis conducted for the Texas City Channel Deepening Project are discussed in Section 9. Detailed information from the EPA's emissions inventory was utilized to describe HGB air quality for the SPCT permit and information from the EIS that is relevant to the Texas City Channel Deepening Project is incorporated by reference (EIS Section 3.1).

Noise

Noise is defined as unwanted sound that disrupts or interferes with normal activities or that diminishes the quality of the environment. Noise is usually caused by human activity and is added to the natural, or ambient, acoustic setting of an area. Exposure to high levels of noise over an extended period can cause health hazards such as hearing loss and the most common human response to environmental noise is annoyance.

Shoal Point is a dredged material placement area bordered by the Texas City Channel to the east and turning basin to the north and west, and by Galveston Bay to the east and southeast. Located immediately adjacent to the west and northwest of Shoal Point is a large area of heavy industrial land use consisting of chemical refineries and storage facilities, and transportational land use that includes rail and port facilities. The nearest noise sensitive receptors are located at a residential area lying approximately 4,500 feet from the site on the northwest side of the industrial facilities. Much of Pelican Island consists of leveed dredge material PAs. The GIWW separates the island from a small undeveloped island to the northwest, known as Pelican Spit. Facilities located on the island include Seawolf Park located on the far northeastern point of the island, Texas A&M University-Galveston located on the southeastern corner of the island, and maritime industries located along the southern shoreline. Detailed information concerning local noise levels, noise receptors and monitoring programs can be found in Section 3.3 of the EIS and is incorporated by reference.

Geology

The project area is situated near the seaward margin of the west Gulf Coastal Plain Physiographic Province (Bureau of Economic Geology (BEG, 1977). The region is characterized by a nearly continuous series of bays separated from the Gulf of Mexico by a system of barrier islands and peninsulas (Lankford and Rehkemper, 1969). The nature and distribution of these features along the coastline are a result of several active geologic processes, including the movement of sediment along the coast, wave action, wind erosion and deposition, tidal currents, and river deposits. A detailed technical description of the geology of the Galveston Bay area is contained in Section 3.5 of the EIS.

Energy and Mineral Resources

Resources produced in the project area and vicinity include oil and natural gas production, sulfur, brine, sand, clay, and shell for the production of lime and other materials. Chief among these resources is oil and natural gas. Sulfur is an important industrial mineral occurring primarily in the cap rock of certain regional salt domes. Oil and gas fields are densely distributed throughout the project area, but none are within the boundaries of the proposed project.

Permitted oil/gas wells and pipelines were identified within a 1-mile radius of Shoal Point and Pelican Island. Fifteen oil and gas well sites occur within a 1-mile radius of Shoal Point. None of these sites occur within the footprint for the proposed project. Ten petroleum pipeline systems occur within a 1-mile radius of Shoal Point. The pipeline systems are listed as active and may contain more than one pipeline/pipeline segment. The pipeline systems are reported to transport a variety of materials including natural gas, refined products, propane, ethylene, liquefied petroleum gas (LPG), and crude oil.

The Railroad Commission of Texas database identified a total of 27 oil and gas well sites located within a 1-mile radius of Pelican Island. Five of these are located within the footprint of the Pelican Island site. One petroleum pipeline system was identified within a 1-mile radius of the Pelican Island site. The pipeline system contains two active pipelines reported to transport natural gas. Detailed information concerning the energy and mineral resources of the project area can be found in Section 3.6 of the EIS.

Surface Soils

The land areas in the immediate vicinity of the proposed project site consist of the Shoal Point area and Pelican Island. Much the soil on these land areas was formed by dredged material from the bays and canals in the project area. Soils on Shoal Point consist of Ijam clay (0 to 2 percent slopes). This soil is a nearly level to gently sloping, poorly drained, moderately saline, clayey soil that has a clay subsoil (Soil Conservation Service, 1988). Permeability and surface runoff are very slow, and shrink-swell potential is high. This soil is found in coastal marshes and has formed in material dredged from bays and canals. Typically, this soil consists of calcareous, moderately alkaline, dark grayish brown to gray clay. In the Pelican Island area, the majority of the soils consist of Ijam clay (0 to 2 percent slopes) as described above. Areas in the eastern coastal portions of Pelican Island consist of Sievers loam (0 to 3 percent slopes), a soil that is nearly level to gently sloping, somewhat poorly drained, moderately saline, loamy soil that has a loamy subsoil. Detailed information concerning the soils in the project area can be found in Section 3.7 of the EIS.

Groundwater Quality and Hydrology

Groundwater in the vicinity of the project area is mostly withdrawn from the Gulf Coast Aquifer system. The Gulf Coast Aquifer is an underground water source consisting of a system of complexly interbedded clays, silts, sands, and gravels, which hydrologically connect five minor aquifers to form a large, leaky artesian aquifer system. Groundwater is generally of good quality in the shallower portions of the Gulf Coast Aquifer, except near the coast where saltwater intrusion limits the amount of freshwater available from the aquifer. Regional groundwater flow in the aquifers is generally southeastward from outcrop areas towards areas of natural discharge. Superimposed upon this natural discharge regime is artificial discharge caused by groundwater pumping. Because of historical groundwater development in the region, water levels declined and localized cones of depression developed around areas of extensive groundwater pumping, altering the natural flow pattern and causing groundwater to flow toward these centers of pumping. However, since the late 1970s and early 1980s, groundwater usage in the area has largely been replaced with surface water, which has resulted in the recovery of water levels in areas of decreased pumping.

Land-surface subsidence has affected most of the project region. Subsidence in the area primarily has been caused by groundwater withdrawals, although subsidence may also result from oil and gas production. Subsidence in the project area, coupled with an increase in impermeable surfaces, has subjected an increasingly large area along Galveston Bay and the HSC to flooding from high tides. Further subsidence has been successfully controlled in the region through the conversion from groundwater to surface water by cities, utility districts and industries, significantly reducing the amount of groundwater being pumped from the primary aquifers in the area. Detailed information concerning the groundwater and the project area hydrology can be found in Section 3.8 of the EIS.

Hazardous Materials Site Assessment

Since the project area for the Texas City Channel Deepening Project is encompassed within the area for the Hazardous Materials Site Assessment study conducted for the SPCT permit, pertinent information from the EIS was used for the EA. The assessment was conducted following the American Society of Testing and Materials Guidelines and Engineering Regulation 1165-2-132. Detailed information concerning the hazardous material assessment and location of sites and facilities for the project area can be found in Section 3.9 of the EIS.

Texas City Channel

According to the hazardous materials report for the area around the Texas City Channel, Texas City Dike and turning basin, 136 listings are identified at 13 sites. Several sites are registered within multiple databases and multiple sites may be located at a single facility or map location. From the regulatory database searches, the following sites are located within the search area radius:

- one NPL site
- one CERCLIS site
- one State Superfund site
- two RCRA TSD sites
- one SWF site
- three RCRA generators sites
- three RCRA CORRACT sites
- one registered storage tank site
- one LUST site
- three facilities with 99 reported emergency response actions and 9 unlocatable reported emergency response actions

- fourteen NPDES sites

None of these listed sites are located in the footprint of the proposed project and will not impact the project.

An underwater archeological survey of the channel was conducted to locate potential historic sites. The underwater survey identified remnants of a civil war flagship in the proposed project footprint. Debris from the shipwreck scattered along the channel bottom includes ordinance and potentially explosive waste. Removal of this hazardous material will be coordinated prior to construction. Additional information about the shipwreck can be found in the Cultural Resources section.

Pelican Island
According to the regulatory agency database report, 23 listings are identified at six sites within the Pelican Island database search area. The following sites are located within the Pelican Island search area:

- two CERCLIS sites
- two State Superfund sites
- three FINDS sites
- two TRIS sites
- three RCRA GEN sites
- two registered storage tank sites
- two NPDES sites
- seven facilities which reported emergency response actions

Surface Water Quality and Hydrology
This section includes a general discussion of Galveston Bay water quality and quantity information. Existing surface water monitoring data and other descriptive information regarding surface water conditions in the project area are presented in detail in Section 3.9 of the EIS.

General Conditions
The Houston-Galveston Area Council (H-GAC) maintains the Data and Mapping Resource Section, a clearinghouse for monitoring data, with oversight from the Galveston Bay Estuary Program (GBEP) and the Galveston Bay Monitoring Subcommittee. Several recent studies have summarized trends in water and sediment quality for the Galveston Bay area. General water quality trends (GBEP, 2001 a) include:

- A decline in salinity over the period of record
- A slight rise in summer temperatures
- An increase in dissolved oxygen
- A decline in ammonia-nitrogen and total phosphorus
- A 75 percent decline in chlorophyll-a over the period from 1975 to 2000
- A decline in fecal coliform bacteria levels over some portions of the bay

Under Section 303(d) of the Federal Clean Water Act (CWA), each state must identify waters that do not meet water quality standards established under the act. Areas in the Galveston Bay system that are included on the State's list of waters that do not meet water quality standards for particular pollutants include the following:

- Lower Galveston Bay is listed for excessive levels of copper in water and bacteria in oysters.
- The Texas City Channel is listed due to occasional low levels of dissolved oxygen.

Total suspended solids (TSS) values in the Galveston Bay system are generally higher near points of inflow, such as the Trinity or San Jacinto Rivers, and lower toward the open-bay system (Ward and Armstrong, 1992). Background total suspended solids in the bay are generally below 100 mg/L.

Galveston Bay sediments are a mixture of fine sands, clays, and silts. A general sediment quality trend was identified for concentrations of metals and commonly measured organic compounds that generally tend to be elevated near regions of runoff, inflow and waste discharges. Lower, more uniform concentrations exist in the open bay. (GBEP 2001 a).

Texas City Channel Area
The Texas City Channel is identified as water quality Segment 2437 by TCEQ and has designated uses of High Quality Aquatic Habitat and Non-Contact Recreation. The salinity data in the Texas City Channel segment is slightly higher than the lower Galveston Bay segment, and dissolved oxygen is slightly lower. Based on the fecal coliform data available, both segments appear to meet contact recreation criteria.

The Texas City Channel has been used for navigation since the start of the 20th century. The current 40-foot project channel was completed in the mid-1960s and generally requires maintenance dredging of approximately 2.4 mcy from the Channel, turning basin and industrial canal on a 3-year cycle. Two primary locations that have been used for placement of dredged material are on the north side of the Texas City Dike as beach nourishment and in Shoal Point. At times, there can be localized areas of higher suspended solids concentrations near the overflow weirs of confined PAs. Higher TSS concentrations are produced in the areas on the north side of the Texas City Dike where dredged material is placed in unconfined areas for beach nourishment. Elutriate tests are routinely performed on sediments prior to dredging to insure sediments and the discharge water do not exceed Texas Surface Water Quality Standards.

Pelican Island Area
One of the proposed PAs is located adjacent to Pelican Island. Waters adjacent to the island are part of lower Galveston Bay. The designated uses for segment 2439, Lower Galveston Bay, are Contact Recreation, High Quality Aquatic Life Use, and Oyster Habitat. Salinity at this site has a large range, but its average is close to half that of sea water. Although the total suspended solids can be high, it averages only 32 mg/L. Also, the coliform bacteria level is well below 200 colony forming units per deciliter, which is the criterion for contact recreation use.

Vegetation

The project area is located within the Gulf Coast Prairies and Marshes Natural Region. The Upper Coastal Prairie of Texas (approximately 21,000 square miles) is a narrow strip, approximately 50 miles wide, that borders the coastal marshes from Matagorda Bay to the Sabine River and corresponds to the wetter side of the Texas Coastal Prairie. Average annual rainfall increases from west to east and ranges from 30 to 50 inches per year. The region includes barrier islands on the coastline, estuarine marshes, remnant tall grass prairies (most converted to agricultural and/or developed lands), oak parklands, and oak mottes. Forested wetlands and riparian woodlands occur in the river bottomlands. Detailed information concerning Gulf Coast vegetation, including upland plant communities, marshes, and submerged aquatic vegetation can be found in Section 3.11 of the EIS and is incorporated by reference

Terrestrial Wildlife

On Shoal Point and Pelican Island, wildlife habitat is severely restricted because the sites are active PAs that are periodically inundated. The western portion of Shoal Point has not been used for placement of material for many years and currently supports a shrub-dominated vegetation community that provides habitat for a variety of wildlife species. Amphibians are not likely to occur in the project area due to the lack of freshwater habitat. The EIS provides detailed information on regional and local habitat and species of reptiles, birds, and mammals that may occur in the project area.

Aquatic Ecology

The Galveston Bay system provides important nursery habitat for numerous commercially and recreationally important estuarine-dependent fish and shellfish species, as well as providing habitat for marine mammals, reptiles, resident birds, wintering waterfowl, shorebirds, and other avian species. The immediate watershed of Galveston Bay also provides a variety of freshwater habitats. This section describes the dominant types of aquatic habitat present within the Galveston Bay system. The EIS provides extensive information on open-bay habitat, open-bay bottom habitat, the open-bay communities, seagrass beds, salt marshes and recreational and commercial fisheries.

Essential Fish Habitat

Congress enacted amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (PL 94-265) in 1996 that established procedures for identifying Essential Fish Habitat (EFH) and required interagency coordination to further the conservation of federally managed fisheries. As set forth in NMFS rules, EFH Assessments must include a description of the proposed action, an analysis of the effects, including cumulative effects of the action on EFH, the managed species, and associated species by life history stages, and include the Federal agency's views regarding the effects of the action on EFH in this EA.

Since the Shoal Point Container Terminal project sites are located in an area that has been identified by the Gulf of Mexico Fisheries Management Council (GMFMC) as EFH for adult and juvenile brown and white shrimp, red drum, and Spanish mackerel; an EFH Assessment was conducted for the EIS. EFH for these species in the vicinity of the project includes estuarine emergent wetlands; estuarine mud, sand and shell substrates; submerged aquatic vegetation and estuarine water column. Detailed information on red drum, shrimp, and other federally managed fisheries and their EFH is provided in the 1998 EFH amendment of the Fishery Management Plans for the Gulf of Mexico, prepared by the GMFMC. The preferred habitat, life history stages, and relative abundance of each EFH managed species are described in detail in Section 3.14.8 of the EIS.

Threatened and Endangered Species

Descriptions of threatened and endangered species are presented in the Biological Assessment prepared for this project (Appendix I). Section 3.15 of the Shoal Point Container Terminal EIS describes in detail the habitats and life-cycles of threatened and endangered species, as well as species of concern, that may occur in Galveston, Harris and Chambers Counties. Table 20 lists the threatened and endangered species and critical habitat identified by the USFWS and NMFS that may occur in the Texas City Channel Deepening Project area in Galveston County.

Table 20
Threatened and Endangered Species Potentially Present in the Federal Project Area

Common Name	Scientific Name	Status	Jurisdiction
BIRDS			
brown pelican	*Pelecanus occidentalis*	E	USWFS
piping plover	*Charadrius melodus*	T; CH	USFWS
reddish egret	*Egretta rufescens*	SOC	USFWS
TURTLES			
Texas diamondback terrapin	*Malaclemys terrapin littoralis*	SOC	USFWS
green sea turtle	*Chelonia mydas*	T	NMFS USFWS
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	NMFS USFWS
loggerhead sea turtle	*Caretta caretta*	T	NMFS USFWS
FISH			
largetooth sawfish	*Pristis pristis*	SOC	NMFS
saltmarsh topminnow	*Fundulus jenkinsi*	SOC	NMFS

TPWD has listed six species as endangered and 17 species as threatened that have some probability of occurring in Galveston County. Some species are migrants or wintering residents only, or may be historic. Additional information concerning the listed species can be found in Section 9 and in Appendix E, Agency Coordination/Consultation.

Cultural Resources

Archival research initially conducted for the SPCT permit application can be applied to the Texas City Channel Deepening Project. A synopsis of previous marine historic properties investigations in the Federal project area and vicinity can be found in the EIS.

The USS *Westfield* (41GV151)

The USS *Westfield*, a U.S. Navy flagship that ran aground during the Battle of Galveston and scuttled to prevent capture on January 1, 1863, is situated partially within the channel area proposed for deepening; therefore, as mandated by Section 106 of the National Historic Preservation Act, the USACE must consider the effects of the proposed project on the wreck. The US Navy owns the remains of the USS *Westfield* because it was an active military vessel when it wrecked. Now that the wreck has been located, the US Naval Historical Center, the Texas State Historic Preservation Officer (SHPO), the non-Federal sponsor, and USACE will be active partners in coordinating the mitigation of the wreck under the terms of the Programatic Agreement in Appendix K. The wreck is potentially eligible for the National Register of Historic Places.

Commercial and Recreational Navigation

Galveston Bay is a major center of both commercial and recreational navigation. Concentrations of recreational boating facilities and activity exist at Galveston and Texas City. Commercial fishing in the bay is a major activity. Both activities have traditionally coexisted with deep-draft commercial navigation. Generally this means that recreational boats stay clear of larger commercial vessels that are restricted to navigation in the dredged channels. Deep navigation channels may be more heavily used than in the present, and this would limit recreational and fishing vessel activity in these areas. However, the vast majority of the bay system area is outside of the navigation channels, and this area will be unaffected by the project. Section 3.17 of the EIS contains detailed information on commercial and recreational navigation, including vessel tonnage and traffic restrictions.

Land Use/Recreation/Aesthetics

Many of the parks and recreational activities are oriented toward water-based activities such as fishing, swimming, windsurfing, boating, birding, and other aquatic-based recreation. Public parks in the project area include Seawolf Park; the Texas City Dike Park which has bait shops, fishing piers, beaches, and boat ramps; and the Bay Street Park, the largest Texas City park, includes playgrounds, sports fields, nature trails, and other typical municipal park amenities. The following land use information was excerpted from Section 3.18 of the EIS, where more detailed information can be found.

Shoal Point PA

Shoal Point lies within the corporate limits of Texas City on Shoal Point peninsula. The site consists of two active PAs (transitional areas) and one inactive PA that is now mainly a shrub/brush rangeland. The site is accessed by a levee road which intersects with Loop 197. To the west of the site is a large area of industrial land use, primarily occupied by chemical refineries and storage facilities, and transportational land use, primarily rail and port facilities. Texas City Terminal Railway (TCT) lines and electrical transmission lines traverse the industrial area. Shoal Point is separated from the industrial area and transportation facilities by the Texas City Channel and turning basin. To the north of the site lies the Texas City Dike, a five-mile-long jetty used for fishing, boating, and swimming. Beyond the industrial areas to the west and northwest of the project area lie older residential and commercial areas of Texas City, numerous city parks, various churches, and an historical park. Many of the commercial establishments appear to be abandoned.

Pelican Island PA

Pelican Island lies within the corporate limits of Galveston to the north of Galveston Island and is accessed via Pelican Island Causeway from Galveston Island and Seawolf Parkway across the island. The GIWW separates Pelican Island from a small island (Pelican Spit) to the northwest. The proposed beneficial use site is located on the western shore of the island approximately one-half mile south of Pelican Spit, which is undeveloped. The only landside access to the beneficial use site is by a levee road. The Texas City Channel parallels the site to the northeast, and is intersected by the HSC and the Bolivar Roads Channel in the vicinity of Seawolf Park. A USGS 7.5-minute topographical map of the site shows various towers and lights in the vicinity, and a gas well nearly one mile west of the site. Beyond the one mile boundary, maritime industries and Texas A&M University-Galveston occur along the southern flank of the island. At the far eastern corner of Pelican Island lies Seawolf Park.

Texas City Dike

Paralleling the north side of the Texas City Channel is the Texas City Dike, from which the Pelican Island site is visible. North of the dike is the HSC. The Sampson Yarborough boat ramp, a bait shop, and a restaurant lie at the end of the dike. Boat ramps are also located on the dike. Two areas on the north side of the dike are used for placement of sandy material dredged from the channel. Periodic replenishment of the beach protects the integrity of the dike from strong currents, and secondarily, provides recreation areas.

Socioeconomics

Significant socioeconomic factors realized through the implementation of this project were documented in the study conducted for the EIS (Section 4.2.20). Factors expecting to experience positive change are population, community values, housing, employment; construction and household income. A detailed socioeconomic baseline was developed for the EIS (Section 3.19), which includes the Texas City Channel Deepening Project area.

Population

The proposed project site lies in Galveston County. Historically, the Houston Consolidated Metropolitan Statistical Area (CMSA) has grown at a faster rate than the state as a whole. As a benchmark against which to compare sub-regional growth, the state has increased in population by 86 percent over the past 30 years (1970-2000) while the Houston CMSA has more than doubled in population, growing by 114 percent during the same period (U.S. Bureau of Census, various years). Texas City has maintained a relatively stable population, experiencing only seven percent growth over the same period, including a period of decline in the 1980s. Galveston has been steadily losing population, with a seven percent loss in population since 1970.

Social Characteristics

Population by Race and Ethnicity

While the state was 53 percent Anglo in 2000, the Houston CMSA was 49 percent Anglo. The Houston CMSA had a greater proportion of African Americans [or Blacks] (17%) than the state (12%) and lesser Hispanic representation (29% versus the State's 32%). Galveston and Texas City have comparatively large African American populations (26 and 27%, respectively), while Pasadena and Baytown have large Hispanic populations, with 48 percent and 34 percent, respectively, and the surrounding communities are predominantly Anglo (>80%). In 2000, the median age of residents in both Texas City and Galveston was 35.5, compared to state's median age of 32.3 years. In 2000, Galveston had a relatively low household size of 2.30.

Compared to surrounding communities, Texas City had a lower percentage of college graduates. In 1990, a somewhat smaller proportion of Houston CMSA residents lived below the poverty level compared with the State, amounting to 15 percent compared with the State's 18 percent. Galveston had a comparatively high percentage (24%). The cities of Texas City and Galveston developed comprehensive development plans for the communities as they would relate to the development of the Shoal Point Container Terminal and the Texas City Channel Deepening Project in a plan to identify and promote community values. This information is contained in Section 3.19 of the EIS.

The EIS also considered housing, occupancy, economic characteristics of the area population (including occupation, location, and travel) and household and per capita income. Leading economic factors used to provide an economic profile of the coastal counties include the number of establishments, sales or shipments, payroll and number of employees, the labor force, unemployment rates, and personal income.

Tourism

General Tourism

The EIS presents detailed information on economic indicators of the impact of travel on Texas and on the Gulf Coast. The Gulf Coast region represents 20 to 25 percent of Texas expenditures, earnings, employment, and tax receipts. Over the 1994 through 1999 period, growth in Gulf Coast tourism exceeded growth in that sector for the State (Texas Department of Economic Development, 2001).

Ecotourism

The study region is located within the Central Flyway for coastal and trans-oceanic bird migration and is thus an attraction for ecotourism and birding. In particular, Texas City was declared by city ordinance to be a bird sanctuary. A study commissioned by the TPWD (Eubanks, 1999) found that an average visitor to the Great Texas Coastal Birding Trail in the Gulf Coast region spent approximately nine days and eight nights recreationally, spending $78.52 per person per day in coastal areas. Annually, each visiting birder spent an average of 31.23 days per year birding along the Trail, averaging $2,452.18 of direct coastal spending per person annually.

Recreational Fishing

As a destination for anglers, the Texas Gulf Coast enjoys economic benefits from recreational fishing. According to the 1996 National Survey of Fishing, Hunting and Wildlife-Associated Recreation (USFWS, 1998), approximately 862,000 recreational anglers over 15 years old participated in 13.03 million days of saltwater fishing on the Texas coast, with an average of 15 days per angler. Approximately 94 percent of those anglers are Texas residents. Those anglers spent $725.4 million, including $202.6 million for food and lodging. On average, each spent $841, including $235 for food and lodging, in the Gulf Coast region. Thus, recreational fishing is a major source of tourism income for the region.

Oil and Gas Production

Oil and gas production is a major industry in the Houston CMSA. The EIS presented detailed information on the number of oil and gas wells and production statistics. The Houston CMSA contains 3.1 percent of the State's oil wells and 2.8 percent of its gas wells (RCT, 2001). From 1996 to 1999, 5 to 6 percent of gas well gas was produced in the Houston CMSA, as well as 3 to 6 percent of casinghead. Three percent of the state's crude oil was pumped in the Houston CMSA and 8 to 11 percent of condensate was produced in the region.

Public Finance

The EIS provides detailed information and tables for tax rate and appraisal information for the major taxing jurisdictions in the vicinity of the project area.

Environmental Justice

To comply with requirements of Executive Order (EO) 12898 Federal Action to Address Environmental Justice (EJ) in Minority Populations and Low-Income Populations, a two-part study was performed for Section 3.19.11 of the EIS and is incorporated by reference. The first part of the study employed the EJ Index Methodology, which is a base analysis created by the EPA, Region 6. The EJ Index helps determine if further investigation of a study area is needed. Further analyses were performed using the U.S. Bureau of Census tract and block level data. This methodology is discussed in detail in the EIS. Three levels of analysis are provided in the EJ Index, as defined below:

<u>Minority Status Degree of Vulnerability</u> EPA Minority Status Degree of Vulnerability maps portray the degree of vulnerability for minority status by census blocks. This factor is derived by comparing the area's percentage of minority population (based on census block data) with the state percentage (39.4%). Minority status is defined to include all non-white as well as Hispanic-origin households.

<u>Economic Status Degree of Vulnerability</u> The EPA Economic Status Degree of Vulnerability maps show the potential degree of vulnerability based on household income (the risk group is defined as households with incomes less than $15,000 per year). The State's percentage of such households is 27.6 percent.

<u>Potential Environmental Justice Index</u> The EPA Potential Environmental Justice Index maps show a composite index incorporating population density, income and ethnicity factors. As this

number is a relative determination based on several factors, there is no State EJ index number for comparison purposes.

Census Tract Analysis

The data used in this study to determine the potential for disproportionate effects to low-income and/or minority populations within the vicinity of each of the project sites are presented in detail in the EIS. The information is based on 1990 county, census tract, and block level data for ethnicity and income. The decision regarding which census tracts and blocks to use was based on the proximity to the project area and the possibility of beneficial or adverse effects potentially accruing to a particular population. Tract 1229.22, block I was used for the Shoal Point site because of the possibility of increased traffic. The census tract and block level data were compared with county level data. A threshold of 10 percent over the county's average percentage of ethnic minorities and economically stressed persons was used to evaluate whether a disproportionate percentage of such groups live within the potentially affected areas.

A sensitivity analysis of the Shoal Point alternative, which included the Texas City Channel feature, showed that using a threshold of either 5 or 15 percent yielded no difference in the findings of each of the demographic groups or economically stressed populations. Therefore, the 10 percent threshold was deemed reasonable and was used as the threshold for the project.

Community Infrastructure and Municipal Services

Section 3.20 of the EIS is a compilation of information regarding utility providers, storm water and drainage services, major streets and public transportation facilities, waste disposal facilities, hospitals security and fire protection currently available at the project sites, and is incorporated by reference. Storm water and drainage are handled by a series of ditches that carry storm water runoff to bayous and to the bay. Water, sewer, gas, electricity, telephone and cable utilities are located in the vicinity of Shoal Point, the Texas City Dike and Pelican Island.

Residential Property Values

Impacts on residential property values focused on traffic noise. According to "The External Damage Cost of Noise Emitted from Motor Vehicles" (Delucchi and Hsu, 1998), property values may decrease from 0.2 to 1.5% for every dBA above 55 dBA, which was established as the threshold "below which most people will not be annoyed and above which most will be annoyed". Existing noise levels for sensitive receptors are presented in the EIS and in the appropriate impact discussions in Section 4.0 and are incorporated by reference. The existing without-project noise levels exceed 55 dBA for most receptors; thus current residential property values already reflect the impact of current project noise levels on property valuation.

9.0 ENVIRONMENTAL CONSEQUENCES

9.1 OVERVIEW

This section discusses the environmental consequences likely to occur from construction and maintenance of the selected plan. The Shoal Point Container Terminal EIS described impacts associated with deepening the Texas City Channel to 45 feet and the construction of placement areas SPPA 1, 1A, 2, 3, 4, 5, and Pelican Island PA. All of these features are being incorporated into the Federal project. Discussion of impacts from construction of these features can be found in the Environmental Consequences Section (Section 4.0) of the EIS. The permit EIS is incorporated by reference as it pertains to the Texas City Channel Deepening Federal project.

PAs 2A, 2B, 5, and 6 are existing PAs associated with maintenance dredging of the 40-foot project and have been previously coordinated for use. All four areas will continue to be used for maintenance dredging activities associated with the 45-foot project.

Proposed Federal project features that are not included in the EIS are the deepening of the existing turning basin, some incidental widening of a bend in the channel; the use of PA 2C, a new 75-acre beach nourishment PA on the north side of the Texas City Dike; and the construction of two, 500-foot long groins on the north side of the dike to contain material placed in PA 2C. This environmental assessment discusses the impacts associated with the new project features.

As part of the plan formulation for the Federal project, four alternatives were evaluated in addition to No Action. They included deepening the channel to depths of 43, 44, 45, and 48-feet. A comparison of the significant environmental resources for each depth alternative is shown in Table 21. Also included is the 50-foot authorized plan. Environmental impacts associated with the 50-foot project are described in the "Galveston Bay Area, Texas, Final Interim Feasibility Report and Environmental Impact Statement, Texas City Channel" dated 1983.

Based on a screening process, alternatives were identified and evaluated relative to a No-Action Alternative. The No-Action Alternative carried forward for evaluation provides a basis against which all other alternative plans are measured. Thus, under the No-Action Alternative, the Federal Government and the non-Federal Sponsor would not implement the proposed channel deepening project. The 40-foot Texas City Channel would not be improved and the objectives of improving navigational efficiency and safety of the waterway would not be met. Additionally, the No-Action Alternative would continue application of the DMMP for the existing project and no benefits associated with proposed beneficial uses of dredged material for the proposed channel deepening project would occur. One exception to the channel remaining at 40 feet, would be if the permittee for the SPCT deepened the Texas City Channel to 45 feet with non-Federal funds.

The environmental impacts for the 43, 44, 45, and 48-foot project depths are very similar. While the quantities of material vary based on the depth of dredging, all three alternatives would utilize the same footprint for the PAs as the 45-foot project. The main difference in the plans would be the height of the confinement levees for the marsh creation sites at SPPA 1, 1A, 2, 3, 4, 5, and Pelican Island. Therefore, the subsequent discussion of impacts is described for the 45-foot project depth. For the 48-foot alternative, an additional 6.8 miles of channel would need to be dredged from the intersection with the HSC to the Gulf, since the current depth of the HSC is only 45 feet. New work and maintenance material from this reach of channel would be placed in existing designated offshore placement areas. As a result of the increased dredging quantity for the 48-foot alternative, an increase in the dredging time would also occur. Consequently, impacts to air quality and water quality will be greater and these are discussed as well.

Table 21
Quantity and Impact Comparison of Project Alternatives

Feature	43-Foot	44-Foot	45-Foot	48-Foot	50-Foot
Channel Length (miles)	Same as 45-ft	Same as 45-ft	7.6	14.4	17
Estimated Cubic Yards Dredged	3,660,000	4,250,000	4,849,000	11,825,000	18,655,000
Placement Areas	Same as 45-ft	Same as 45-ft	SPPA 1,2,3,4,5; PIPA; PA 2A, 2B,2C, 5, 6	Same as 45-ft & ocean disposal	PA 5, 6; 600-ac wetland site; 90-ac upland site; ocean disposal
Bay Bottom	Same as 45-ft	Same as 45-ft	1,162 acres impacted Benthos habitat impacted; ultimately repopulates	Same as 45-ft	730 acres impacted Benthos habitat impacted; ultimately repopulates
Wetlands	Same as 45-ft	Same as 45-ft	999 acres of emergent marsh created	Same as 45-ft	600 acres of emergent marsh created
Endangered Species	Same as 45-ft	Same as 45-ft	No impact; positive effect due to marsh creation	Same as 45-ft	Little to no effect; potential positive effect due to marsh creation
Cultural Resources	No effect	No effect	Impact to one National Register eligible site	Same as 45-ft	Same as 45-ft
Water Quality	Minimal salinity increase; temporary elevated turbidity	Slightly higher salinity than 43-ft but less than 44-ft; temporary elevated turbidity	Slightly higher salinity than 44-ft; temporary elevated turbidity	Slightly higher salinity than 45-ft; slightly longer elevated turbidity level than 45-ft	Slightly higher salinity than 48-ft; slightly longer elevated turbidity level than 48-ft
Air Quality	Slightly lower VOC and NOx generated during construction than 44-ft due to shorter construction time	Slightly lower VOC and NOx generated during construction than 45-ft due to longer construction time	Air analysis ongoing – TCEQ compliance is expected	Slightly higher VOC and NOx generated during construction than 45-ft due to longer construction time	Slightly higher VOC and NOx generated during construction than 48-ft due to longer construction time
	No effect	No effect	No effect	No effect	No effect
Aquatic Areas	Same as 45-ft	Same as 45-ft	Temporary elevated turbidity; possible substrate community impact; avoids oyster habitat	Same as 45-ft	Same as Essential Fish Habitat
Essential Fish Habitat	Same as 45-ft	Same as 45-ft	1,162 acres of shallow bay impacted to create 999 acres of marsh; 76 acres for beach nourishment and groins	Same as 45-ft	730 acres of bay bottom covered; 105 acres shallow bay disturbed; adequate mitigation from marsh creation
Socioeconomics	Growth potential threatened; current economic trends continue; community stability and cohesiveness maintained; no safety aspects provided to shipping	Same as 43-ft	Growth potential sustained; current economic trends in continue; community stability and cohesiveness maintained; safety aspects provided to shipping	Same as 45-ft	Same as 45-ft
Recreation	Same as 45-ft	Same as 45-ft	76 acre beach nourishment site created at the dike; two groins to contain material. Local support for recreational development	Same as 45-ft	90 acres upland site at the dike possible detriment; Local support for recreational development

9.2 SELECTED PLAN

Physiography, Topography, Bathymetry and Geology

Dredging activities required to deepen the Texas City Channel and turning basin will permanently alter bay bottom bathymetry. The current channel would be deepened by five feet to 45 feet from Shoal Point to the intersection with the HSC while maintaining the current 400-foot width. Surface topography changes are primarily associated with construction of the PAs and the Texas City Dike groins. Approximately 256,000 CY of new work material and 94,000 CY of shoaled material dredged from Station 28+000 to Station 31+000 to ease a bend in the channel will be used to construct two groins at the Texas City Dike and fill the PAs. Construction of the groins and filling the area will result in 76 acres of bay bottom impacts. Approximately 4.8 mcy of material dredged from the channel and turning basin will be utilized for construction of containment levees for PAs that can beneficially use the material, and for construction of groins on the Texas City Dike to entrap and retain the material. Approximately 1,086 acres of bay bottom will be impacted to construct the PAs, and will eventually result in 999 acres of emergent marsh (Figure 4 and Table 22). These bathymetry and topography changes are expected to have negligible impacts on the submerged and subaerial portions of the project. Impacts to the local geology due to the project were identified in the EIS. These include redistribution of sediment, local increases in turbidity and potential increases of local scouring and shoaling. These net impacts on the local geology are considered minimal.

<table>
<tr><th colspan="3">Table 22
PA Impacts and Marsh Creation</th></tr>
<tr><td>Placement Areas</td><td>Bay Bottom Impacted (acres)</td><td>Emergent Marsh Created (acres)</td></tr>
<tr><td>SPPA 1*</td><td rowspan="2">357</td><td>95</td></tr>
<tr><td>SPPA 1A*</td><td>262</td></tr>
<tr><td>SPPA 2</td><td>156</td><td>124</td></tr>
<tr><td>SPPA 3</td><td rowspan="3">469</td><td>138</td></tr>
<tr><td>SPPA 4</td><td>120</td></tr>
<tr><td>SPPA 5</td><td>161</td></tr>
<tr><td>Pelican Island PA</td><td>104</td><td>99</td></tr>
<tr><td>PA 2C</td><td>75</td><td>NA</td></tr>
<tr><td>PA 2C groins</td><td>0.6</td><td>NA</td></tr>
</table>

*To be constructed by the Non-Federal Sponsor

Air Quality

It should be noted that the dredging and construction activities associated with the Texas City Channel Deepening Project were accounted for in the Final General Conformity Determination for Texas City's Proposed SPCT, November 2002 (U.S. Army Corps of Engineers, Galveston District, Final Environmental Impact Statement for Texas City's Proposed SPCT, Volume II, Appendix H-9, November 2002). The conformity determination for the SPCT Project was approved by letter dated September 9, 2002. The TNRCC provided a Conditional General Conformity Certification for the SPCT project stating that "construction emissions are accounted for in the applicable SIP based on information provided to date." The SPCT project included construction of an access road, a wharf, container yard and dredging of the channel, berthing areas, and turning basin. Emissions associated with dredging and related construction activities were assumed to occur in Phase II of the project. Therefore, the emissions for the channel dredging of the proposed Federal project were already accounted for and should not be included in the current emissions calculations.

There are two main differences between the SPCT and Texas City Channel Deepening Project. The Texas City Channel Deepening Project includes only dredging and construction activities related to the deepening of the Texas City Channel while the SPCT Project included these activities as well as additional construction activities associated with construction of an access road, wharf and container yard. NO_X emissions associated with dredging and dredging related activities which were included in the SPCT Conformity Determination were 46.2 tons during 2006 and 6.2 tons per year during 2007. VOC emissions associated with dredging and dredging related activities which were included in the SPCT Conformity Determination were 8.9 tons during 2006 and 0.9 tons per year during 2007. The emissions included in this report were reduced by these amounts during 2010 as the vast majority of emissions associated with the Texas City Channel Deepening Project occurred during this year.

In estimating NO_x and VOC emissions, the use of equipment and the duration of activities for construction were determined based on information provided by the Galveston District. The increase in emissions was then calculated using the USEPA provided guidance and emission factors. The project is assumed to take place during the period from 2008 to 2012. A list of equipment and an assumed operating schedule was provided on a per contract basis. The majority of construction activities will be marine-based and a very small group of people (approximately 25) will actually commute to and from the site on a daily basis. As such, traffic emissions do not need to be included since there is a negligible increase in passenger trips for the project. Detailed emissions calculations for these sources are presented in Appendix A of The Texas City Channel Deepening Project, Final General Conformity Report, February 2007, which is located in Appendix D of this GRR/EA. Emissions have been broken down by land based and marine based equipment and then further categorized by calendar year. VOC and NO_X emissions from construction would result from the use of construction equipment and amphibious dredging equipment.

Table 23 provides total emissions per calendar year for the project duration (2008 to 2012) along with additionally separating emissions for each year by equipment type (i.e. land or marine based). Table 23 also compares project emissions with the combined 2004 Statewide Diesel Construction Non-Road Mobile Emission budget provided by Karla Harrison of the TCEQ Mobile Source Monitoring Department and taken from the 2004 Houston-Galveston-Brazoria (HGB) Area State Implementation Plan (SIP). Emissions from each year are less than 10% of the budget.

The difference in air quality impacts from dredging the project to 43 or 44 feet would be a slightly lower emissions output than the 45-foot project alternative, whereas the difference in emissions from dredging the project to 48 feet would be a slightly higher emissions output than the 45-foot project alternative.

Table 23
Summary Total Emissions

Year	Marine Based Emissions (tons/year)		Land Based Emissions (tons/year)		Total Emissions (tons/year)		HGB NO_X Emission Inventory (tons/year)	% of Inventory
	VOC	NO_X	VOC	NO_X	VOC	NO_X		
2008	15.41	403.95	0.97	17.00	16.38	420.95	11,411.99	3.69
2009	5.02	114.61	0.48	8.41	5.50	123.01	11,697.29	1.05
2010	42.44	1,171.28	0.38	4.79	42.82	1,176.06	11,989.72	9.81
2011	19.06	437.00	0.13	1.60	19.19	438.60	12,289.46	3.57
2012	4.94	87.33	0.00	0.00	4.94	87.33	12,596.70	0.69

* 2.5% annual growth rate applied to NO_X emissions inventory for each year as per Karla Hardison of the TCEQ Mobile Source Monitoring Department.

As shown in this analysis, the emission values for the proposed action exceed the *de minimis* criteria of 100 TPY for NO_X during the years of 2008 through 2011, therefore a formal conformity determination was prepared. The formal analysis included a comprehensive emissions determination which detailed emissions based on contract, year and equipment type. This formal analysis determined that the project will be in conformity with the HGB SIP based upon the following:

- Emissions for each year are less than the designated emission inventory presented in the SIP.

- Emissions from the action for each year are below ten percent of the total construction emissions inventory for both NO_X and VOC's based on the 2004 SIP for the HGB Area.

The complete air conformity analysis can be reviewed in Appendix D of this GRR/EA. The TCEQ Air Quality Division has concurred with the conformity analysis determination that emissions from the proposed project will not exceed emissions from the HGB Area SIP. As a result, this project is not considered to be a "regionally significant" activity, and thus the project construction emissions conform to the SIP.

In support of the National Ambient Air Quality Standards, the USACE will adopt pollution prevention and/or reduction measures in conjunction with the Texas City Channel Deepening Project, such as those suggested in the TCEQ General Conformity Concurrence letter dated 25 May 2007, also located in Appendix D. The USACE can encourage construction contractors to apply for the Texas Emission Reduction Plan grants and direct construction contractors to exercise air quality best management practices. However, some of the suggestions are cost prohibitive or prohibited by Federal regulation or policy and could require legislation or Washington level decisions or actions.

Roadway Traffic Impact Analysis

Most of the construction traffic to dredge the Texas City Channel Deepening Project would be from the daily workers transiting to and from staging areas. It is expected that most of the equipment required to construct the project will be brought in by barge rather than via the roadways. Therefore, only minimal traffic impacts are anticipated as a direct result of the project.

Noise

The proposed project is located in an industrial area that generates elevated noise levels from ongoing operations, 24-hours a day, seven days a week. Noise associated with the project would be generated during construction and during maintenance dredging activities. Major sources of noise associated with deepening the channel to 45 feet would be generated by the dredge, support work boats, and heavy equipment used to move and place riprap on the Texas City Dike groins. It is expected that most of the equipment required to construct the channel project will be brought in by barge. The nearest residential receptors are located 4,500 feet northwest of the turning basin. The west end of the project, adjacent to Shoal Point, is the closest part of the project to residential receptors, with the majority of the project located further away from receptors. Noise levels would be expected to increase temporarily during the construction phase. Noise generated by construction of the project is not expected to exceed the existing noise level at the nearest residential receptor. Therefore, no significant adverse noise effects are anticipated as a direct result of the project.

Energy and Mineral Resources

The selected plan would have no impacts on energy resources in the project area. There are no active petroleum wells in the project alignment and PAs. There are no known facilities or utilities to be relocated within the project area.

Surface Soils

The selected plan would not impact surface soils within the project area. Maintenance material dredged during the life of the project is designed for placement as fill in newly constructed PAs to build up the sites for creation of marshes. Material high in sand content placed on the beach on the north side of the Texas City Dike (PAs 2A, 2B and 2C), is designed to replenish beach material and protect the integrity of the dike.

Groundwater and Hydrology

Soils that will be excavated consist primarily of soft to stiff clays with some lenses of sand and gravel. Sand lenses that may be excavated do not provide effective conduits to serve as aquifers. As such, no groundwater will be intercepted or is expected to be withdrawn as a direct result of the proposed project. Construction and maintenance of the proposed project will not impact area groundwater recharge and groundwater quality or quantity. Any shallow groundwater contamination that could occur during construction of the project will be minimized by the use of best management practices and compliance with Federal, state and local regulations.

Hazardous Materials

Construction and maintenance of the selected plan will not impact hazardous waste sites identified in the surrounding area but are well outside the project footprint. Use of hazardous materials during construction of the project is expected to have minimal risk of impact. Fuel storage tanks, oil drums and other regulated materials will likely be staged in or near the project construction zone. Construction of the project will allow larger ships carrying hazardous cargo to enter the Port of Texas City. An indirect impact of the project would be the potential for an increase for spills due to an increase in hazardous cargo shipped through the port and transported by rail or truck. The potential risk for spillage of these materials is reduced with implementation of spill response plans and use of best management practices during and after construction.

An underwater archeological survey of the channel identified ordinance and potentially explosive waste among the debris of a wrecked civil war flagship in the project footprint. This hazardous material will be removed from the channel prior to construction and removal will be coordinated with the SHPO and the U.S. Navy. Additional information about the shipwreck can be found in the Cultural Resources section of the EA.

Surface Water Quality

Dredging to construct levees for five new semi-confined PAs will cause short-term increases in turbidity at the dredging site and at the PA sites. Results of bioassays conducted in 1987 concluded that the dredged material would cause no significant undesirable effects. Also, laboratory results of representative samples of material to be dredged that were chemically and physically analyzed five times over the last 15 years have shown that no water quality standards for toxic contaminants will be exceeded during dredging activities and that the material is environmentally suitable for upland or aquatic disposal and for beneficial uses.

Studies conducted for the EIS included 2-dimensional modeling of the effects of salinity changes due to deepening the Texas City Channel by five feet (PBS&J 2002) and are incorporated by reference (Section 4.2.10). The Texas City Channel is essentially a dead-end channel and has little freshwater flow at the upstream end of the channel. Some short-term decrease in salinity should be expected in the upper channel area following runoff from heavy rains producing freshwater inflows. In stable dry conditions when salinities in Texas City Channel and West Bay are essentially equal to those of the near-shore Gulf, the effect of deepening the channel is expected to be very small. On the average, salinity in the Texas City Harbor is expected to be slightly higher, but not have significant impacts. The difference in salinity impacts from dredging the project to 43 or 44 feet would be a slightly lower salinity effect than the 45-foot project alternative, whereas the difference in salinity impacts from dredging the project to 48 feet would be a slightly higher salinity effect than the 45-foot project alternative.

Vegetation

The proposed project would have no direct impact on plant communities because no upland habitat would be disturbed. Material dredged from the channel would be used to construct levees for PAs and groins for the Texas City Dike, and maintenance material would be disposed in existing or newly constructed leveed aquatic PAs. Over time, some plant communities will become established after placement of material in the PAs up to a suitable elevation and create habitat that will evolve over time.

Wetlands and Open Water

No wetlands will be impacted by the proposed project. Open water impacts include deepening the channel from 40 feet to 45 feet, constructing dredged material PAs adjacent to Shoal Point and Pelican Island and the construction of two groins on the north side of the Texas City Dike. The Shoal Point and Pelican Island PAs will impact 1,086 acres of open bay bottom. However, the sites ultimately will be converted into emergent marsh. The DMMP for the project is primarily the DMMP that was developed during the 2002 EIS process. The plan was developed in coordination with the resource agencies and has been adopted for the Texas City Channel Deepening Project. Approximately 75 acres of open bay bottom will be impacted by the PA 2C and 0.6 acres of open bay bottom will be impacted by the construction of the groins on the north side of the dike. Although 1,086 acres of bay bottom will be impacted by construction, the resulting marsh creation will provide beneficial habitat for aquatic resources. This conversion of habitat from bay bottom to emergent marsh was considered beneficial by all state and Federal resource agencies. No other natural resources will be adversely impacted; therefore no mitigation is required for the project.

Terrestrial Wildlife

No impacts will occur to terrestrial wildlife as there will be little to no clearing of vegetation that would destroy wildlife habitat during construction of the selected plan since the PA construction occurs in the submerged environment. Placement of dredged material in semi-confined cells will eventually create marsh habitat for wildlife loafing, nesting, or foraging.

Aquatic Ecology

An evaluation of environmental consequences on the aquatic environment for the EIS determined that construction and maintenance of the Texas City Channel and turning basin is expected to cause temporary, elevated turbidities that may affect some aquatic organisms near the dredge activity. Turbidities in open-bay habitat would be expected to return to near ambient conditions after dredging ceases. Construction of PA levees with new work material is expected to result in a fluid mud flow, with fine silt particles settling out over the bottom for up to 2,500 feet from the placement center, possibly impacting aquatic substrate communities. Following levee construction, re-colonization of the sediments by benthic communities is expected to occur over a 3-12 month time period. Also, areas of hard bottom within the mud flow zone could be buried and become unsuitable for oyster habitat. Positioning the PA a sufficient distance away from identified oyster reefs will minimize adverse impacts to the oysters. It is likely that areas with hard substrate experience enough wave energy to re-suspend the material and revert the substrate to original conditions after the levees are complete.

Essential Fish Habitat (EFH)

The loss of productive EFH during construction of the PAs will have temporary adverse impacts on adult and juvenile brown and white shrimp and red drum. However, the establishment of new marsh areas will benefit these species by creating new intertidal marsh habitat. As a conservation measure to ensure minimal impacts to EFH and to ensure consistency with the EFH provisions of the MSFCMA, the selected plan will maintain openings for tidal influence to SPPA 1-5 until such time as they are needed for maintenance dredging.

Mitigation
No mitigation is required for the project. No wetlands will be impacted by the project. During the coordination efforts for the SPCT permit, development of the DMMP was fully coordinated and agreed upon by the resource agencies. Although 1,162 acres of bay bottom will be impacted, the bay bottom will be replaced by 999 acres of emergent marsh, benefiting fisheries and the aquatic environment. Therefore, mitigation is not required.

Threatened and Endangered Species
Impacts to threatened and endangered species are addressed in the Biological Assessment (BA) prepared for this project (Appendix I). The BA concludes that the project will have no effect on any federally listed species or critical habitat and USFWS and NMFS have concurred in this finding.

Cultural Resources
Only one historic property (41GV151) has been identified. Channel improvements would cause an adverse effect to site 41GV151, the National Register eligible wreck of the USS *Westfield*.

All areas to be impacted by construction of the proposed Federal project have been surveyed and assessed for historic properties with the exception of the following navigation feature and one section of channel proposed for deepening. An historic properties investigation will need to be conducted for dike construction north of the Texas City Dike.

Although the proposed project will adversely affect the National Register-eligible USS *Westfield,* it is necessary to defer completion of further survey, assessment and data recovery until the proposed project is approved and funded. A Programmatic Agreement (Appendix K) has been negotiated under 36CFR800.14(b) that specifies actions which will be taken by USACE prior to or during the project construction period to mitigate adverse effects. In accordance with the Programmatic Agreement, a treatment plan for further investigation and data recovery of the USS *Westfield* has been developed in consultation with the SHPO, U.S. Navy, non-Federal sponsor, and USACE.

There is potential for data recovery costs for the proposed Federal project to exceed the one percent cap established by the Archeological and Historic Preservation Act of 1974 (PL 93-291). As soon as practicable, the USACE will determine if a waiver will be sought in accordance with Section 208 of the National Historic Preservation Act Amendments of 1980. The total estimated Federal cost of the project is $43,991,960 and therefore data recovery costs for mitigation cannot exceed $439,919 unless a waiver to the one percent limitation is obtained. Activities to research, survey, and evaluate historic properties will not be considered mitigation data recovery costs. The project purpose which causes the need for data recovery is navigation, and therefore any costs that exceed the one percent level will be shared by the Federal government and the local sponsor in accordance with the cost sharing formula for navigation features.

When survey and assessment investigations are complete, a data recovery plan will be determined in accordance with the requirements of the Programmatic Agreement and a final cost estimate will be generated. At this time, USACE will determine if a waiver of the one percent limitation will be sought. A letter report with supporting documentation will be prepared which provides a detailed justification for the need to exceed the one percent level. This waiver will be submitted to the USACE Federal Preservation Officer (FPO). After review and HQ coordination of the waiver request, the FPO will submit the waiver request to the Secretary of the Interior for concurrence and Congressional notification.

Commercial and Recreational Navigation
Section 4.2.18 of the EIS contains an exhaustive characterization of the existing commercial and recreational vessel traffic, including vessel encounters and delays, and is incorporated by reference. This information was also used as the baseline for projected vessel traffic after deepening of the Texas City Channel to 45 feet from Shoal Point to the confluence with Bolivar Roads. With the deepened channel, vessel traffic is expected to increase, especially for larger vessels. However, coordination of vessel traffic through the channel with the Port Captain, USCG, and the pilots will minimize vessel delays and safety issues.

Galveston Bay is used extensively by bay commercial fishing vessels and recreational boaters and would be impacted by larger vessels to a certain extent. Deep draft navigation vessels must have right-of-way over small craft for navigation and safety reasons. With increases in deep draft commerce the number of delays and yield to right-of ways experienced by small vessels will increase. However, many of these smaller vessels are not restricted to the dredged channels so the actual limitations should be small and avoidable.

Land Use/Recreation/Aesthetics
Construction of the proposed project will not directly impact adjacent land uses as placement of dredged material in existing PAs will be consistent with existing land uses. The anticipated increase in roadway traffic due to increases in larger vessel traffic is not expected to impact the roadways. The exception is truck traffic on FM 519 between Loop 197 and IH 45, which passes through a commercial and residential area. Secondary support businesses that might occur due to the increase in commerce would be consistent with current land uses.

The Texas City Channel and turning basin is located in a restricted channel and industrial area and should only minimally impact recreational boaters. The proposed project should not interfere with fishing or other recreational activities on the Texas City Dike during placement of dredged material on the north side of the dike because this action will be of short duration. It is projected that the addition of material in area 2C will create a beach 100 feet wide and 2000 feet long. The addition of material at the Texas City Dike will actually enhance recreational activities and opportunities with enlargement and stabilization of the beach area. Conversion of bay bottom to sites that use dredged material beneficially to create habitat for different species, could ultimately create additional opportunities for birdwatchers and anglers.

The most valuable aesthetic views identified in the EIS in association with the channel deepening are from the Texas City Dike, First Ladies Pavilion, Skyline Road and the Thomas S. Mackey

Nature Center. The views from these locations are not expected to dramatically change due to the proposed project. PAs where new habitat has developed would attract naturalists who value viewing wildlife.

Socioeconomics
Significant socioeconomic factors realized through the implementation of this project were documented in the EIS (Section 4.2.20). Factors expected to experience positive change are population, community values, housing, employment, construction, household income, and property values. Construction of the proposed project will increase the availability of jobs for the duration of construction. The increase in workers is expected to create an increase in temporary housing needs and boost local tax revenue. A review of Environmental Justice data indicates the average percent of minorities and low-income populations in the vicinity of the Texas City Channel are generally lower than the county average. The exception is a slight increase over the county average of minorities categorized as "other races". Deepening the channel and turning basin is not expected to adversely impact property values in the vicinity of the channel and port. Socioeconomic studies also indicate local property values are expected to decline with or without construction of the deepened channel. No adverse EJ impacts were identified as a result of the proposed project.

9.3 SUMMARY OF IMPACTS

Deepening the Texas City Channel to 45 feet was one of the components of the SPCT Project (USACE Permit No. 21979) and was addressed in the November 2002 EIS. The EIS disclosed all environmental impacts associated with the proposed channel deepening for the permit action. The deepening impacts for the permit action are the same for the current Federal proposal to deepen the channel to 45 feet and the proposed action was coordinated with the resource agencies to minimize and avoid adverse impacts. Impacts of the Texas City Channel Deepening Project that have not been previously coordinated include deepening the existing turning basin, and construction of two groins on the north side of the Texas City Dike that will form the new 75-acre PA 2C to contain dredged maintenance material. These impacts are fully disclosed and evaluated in this document. In addition, any environmental or regulatory changes that occurred since the completion of the November 2002 EIS have been considered.

10.0 CUMULATIVE IMPACTS AND OTHER RELATED ANALYSES

10.1 CUMULATIVE EFFECTS

An extensive cumulative effects analysis conducted for the EIS (Section 4.8) included Galveston, Harris, and Chambers Counties and is summarized in this section. Air and traffic analysis focused on the HGB, which includes an eight county area comprised of Galveston, Harris, Chambers, Brazoria, Fort Bend, Montgomery, Waller and Liberty Counties). Other analyses focused on Galveston, Chambers and Liberty Counties. Past, present and future development in the Area of Impact (AOI) had both adverse and beneficial cumulative effects. Potential adverse effects include loss of bay bottom habitat and air and water quality impacts. Beneficial effects of development in the AOI include conversion of bay bottom to emergent marsh, new economic opportunities, employment opportunities, and recreational resources. Additional housing, infrastructure, and commercial and public land uses required to serve the projected population would result in continued development in the region. As development continues, transportation improvements would be needed. The conversion of natural wildlife habitat and agricultural lands into commercial, residential or industrial land uses would continue to disrupt and disperse fish and wildlife populations. The loss of wetlands in the area would continue to affect natural resources. Development of sites that can be used beneficially for the environment should preserve, restore, and create habitat to ensure the ecosystem's sustainability. Although dredging would affect water quality, the impacts would be temporary and localized. Use of best management practices and spill prevention measures should result in minimal adverse impacts to water quality and aquatic resources in the AOI. Increased development in the HGB is likely to contribute to additional and varying amounts of air pollution emissions. Emission control measures proposed in the SIP are expected to significantly reduce emissions of ozone precursors in the HGB. TCEQ also has regulations in place to control emissions of other pollutants, reducing the potential impact.

The many projects occurring in the general vicinity of the Texas City Channel Deepening Project are part of the continued urbanization and industrialization of Harris, Galveston and Chambers Counties. The potential cumulative effects of these projects accompany this trend and will affect environmental, social and economic receptors. Potential impacts related to the construction of the Texas City Channel Deepening Project to the many projects occurring in the AOI would be controlled by governmental regulations and the goals and coordination of community planning efforts. These entities serve to safeguard resources and avoid or minimize negative impacts that adversely affect the general health and sustainability of the region.

10.2 PAST, PRESENT AND FUTURE ACTIONS

Activities in Harris, Galveston and Chambers Counties requiring permits from both the TxGLO and the USACE were considered as part of the cumulative effects evaluation the Shoal Point Container Terminal EIS. The largest categories of TxGLO permitted activities include construction, maintenance or removal of marine structures, pipeline installation, maintenance or removal of pipelines, habitat creation, shoreline stabilization and transportation projects. Currently, there are over 3,200 TxGLO easements in the 3-county area. USACE permitted activities exceed 2,500 permits for the 3-county area and primarily pertain to marine structures, dredge/fill, shoreline stabilization, pipelines, bulkheads, stormwater, wells/drilling and transportation. Further discussion is found in section 4.8.7 of the EIS. Specific actions that may contribute to overall cumulative effects in the area were discussed in Section 4.8.11 of the EIS and include the following projects:

- Modifications to SH 146, SH 3 and IH 45
- Proposed SH 87 Bolivar
- Grand Parkway
- 2022 Metropolitan Transportation Plan (MTP)
- Transportation Improvement Plan (TIP)
- Burlington Northern and Santa Fe Railway Bayport Loop Buildout
- Port of Houston Authority (PHA) Bayport Container Terminal
- Cedar Crossing Industrial Park
- American Acryl Property
- Houston/Galveston Navigation Channels Project
- Texas City "Y" – Modifications to Texas City Channel and GIWW Intersection
- Texas City Channel Federal Project

10.3 CONCLUSIONS

Adverse impacts to natural resources in the region have resulted from general trends in population growth and economic development. Such effects are expected to continue to occur from development related to normal growth in the region. These impacts, and impacts resulting from the proposed action, combine and interact to result in cumulative effects upon the project area. Potentially adverse cumulative effects associated with past and continued future development of the project area are loss of habitat, air and water quality impacts, and conversion of land uses. General beneficial effects of development in the region include new economic opportunities, housing alternatives, employment opportunities and recreational resources.

Additional housing, infrastructure, and commercial and public land uses required to serve the projected population, with or without the project, would result in continued development and land use changes in the region. Extensive residential development is proposed in many of the communities in the project area. Restaurants, retail shops, marinas, office complexes, business parks, and convenience stores are among the commercial developments currently being designed or constructed. The need for additional infrastructure and services increases as development occurs (schools, transportation, utilities, fire, police, and emergency medical services). Transportation improvement projects in the region include highway, road, bridge, or overpass construction, reconstruction, widening, or upgrades to accommodate current and projected traffic in the area. Residential, commercial, office and industrial types of development would be accompanied by increased economic opportunity and area employment.

Development impacts associated with normal growth in the region are expected to result in conversion of wetland, riparian, and upland habitats and agricultural lands into commercial, residential or industrial land uses, as well as additional infrastructure and services as people continue to move into the area. Habitat fragmentation from infrastructure construction or changes in land use have disrupted and dispersed fish and wildlife populations. Both natural and artificial processes, including historical, human-induced subsidence and relative sea level rise as well as draining and filling wetlands for development have resulted in the conversion of wetland habitats to open water or upland habitat. However, some losses have been partly offset by gains in emergent wetlands that took place in transitional areas peripheral to wetlands (related to subsidence or water management programs). Although there have been significant losses to wetlands and other habitats since the 1950s and the continued urbanization and industrialization of the Houston-Galveston area will cause continued pressure on these habitats and the ecosystem, efforts to preserve, restore and create valuable habitat are underway that should ensure the ecosystem's sustainability despite continuing pressure of development of the region. The use of dredged material beneficially in Galveston Bay should aid in this effort by creating emergent wetlands to support plant growth, fisheries, and wildlife. There will be no impacts to wetlands and protected species and project mitigation is not required.

Although historical water quality problems have been concentrated in the western urban tributaries, Galveston Bay has maintained good water quality overall. Water quality effects of dredging activities throughout the project area would result primarily from turbidity associated with dredging activities; however, these impacts tend to be temporary and localized. Various existing and planned developments in the area have a potential cumulative water quality impact on the receiving water bodies due to wastewater discharges and urban runoff. Use of best management practices for controlling runoff and thereby limiting potential contamination of the open bay habitat, and spill prevention and control measures for minimizing impacts of accidental spills should result in minimal adverse impacts to water quality and aquatic resources.

As the HGB continues to experience growth in the regional population and economy, the resulting increases in traffic and industrial capacity would be expected to contribute to additional and varying amounts of air pollution emissions. Within the HGB Quality Control Region, ozone is the only criteria pollutant for which the region fails to meet the NAAQS. Even with increased growth in the area, historical ambient air monitoring data for the HGB indicates a long-term downward trend in ozone (HGBAC, 2000). This is generally the result of efforts made to reduce emissions from various sources of VOCs. Under current regulations, the HGB has until 2007 to attain the NAAQS for ozone. The TCEQ has the responsibility for developing the SIP for attaining the air quality standard in the HGB. The SIP sets emissions budgets for point sources, area wide sources, off-road mobile sources, and on-road sources. The emission control measures proposed in the December 2000 SIP revisions are expected to significantly reduce emissions of ozone precursors and provide attainment. In addition, reductions are also expected from expansion or improvement of high occupancy vehicle lanes, traffic flow management, park-and-ride lots, public transportation, and rideshare programs. Emissions reductions consider the need to offset a potential increase in emissions due to growth in the region resulting in increased traffic and industrial capacity.

In addition to the control of emissions to facilitate attainment of the ozone standard, the TCEQ also has regulations in place to control emissions of other pollutants, even though the NAAQS for these pollutants is being met. These regulations affect sources of particulate matter, SO_2, hazardous air pollutants, and other air emissions from industrial facilities and are designed to provide for growth in a way that will continue attainment of the standards.

Air emissions from the proposed action added to other past, present and reasonably foreseeable future actions would be addressed by the regulatory framework described above. The TCEQ and EPA are responsible for monitoring and tracking air quality levels and the identification of potential air quality exceedances. Adjustments will be made to the SIP, as appropriate, to achieve and maintain continued attainment of the standards. In addition, within the HGB, industrial, community, and municipal groups are working cooperatively with the regulatory agencies to identify ways to continue to reduce emissions while allowing for growth in the area.

In conclusion, the many projects occurring in the general vicinity of the proposed Texas City Channel Deepening Project are part of the continued urbanization and industrialization of Harris, Chambers and Galveston counties. The potential cumulative effects of these projects accompany this trend and will affect environmental, social, and economic receptors. However, existing governmental regulations, in conjunction with the goals and coordination of community planning efforts, address the many and varied issues that influence the local and ecosystem-level conditions. The vision, goals and, ultimately, the coordination of the numerous stakeholder groups by local organizations, and the regulatory powers of State and Federal programs in addition to regulations such as the TCMP, the CWA, and the CAA, serve to safeguard these resources and prevent or minimize negative impacts that would threaten the general health and sustainability of the region.

11.0 RECOMMENDED PLAN, COMPARISON TO AUTHORIZED PLAN AND PLAN IMPLEMENTATION

11.1 OVERVIEW

Based on the economic, engineering and environmental factors considered, the recommended plan includes deepening of the Texas City Turning Basin and Texas City Channel from the Turning Basin to the channel junction with the HSC to -45-foot MLT. The work is estimated to begin in 2008 and be complete by 2010.

11.2 RECOMMENDED PLAN

The recommended plan is also the locally preferred plan of dredging the Texas City Channel including the turning basin to its intersection with the HSC, to a depth of 45-feet. Incidental widening for easing a bend and making the channel more linear is necessary between Station 19+339.69 to Station 21+716.78, so that ships can navigate the bend more easily. Two secondary hydraulic-fill finger groins will be added to the north side of the dike near its eastern tip for the purpose of retaining of maintenance material when it is placed behind the groins, thereby preserving and even building-up the beach areas. Deepening and incidental widening of the Texas City Channel and turning basin will generate approximately 4.8 mcy of new work material and 43.6 mcy of maintenance material over the 50 year period of economic evaluation. Three foot advanced maintenance dredging for maintenance of the turning basin and channel is proposed. A one foot over-depth dredging tolerance for the turning basin and 2 feet of over-depth dredging tolerance for the main channel is proposed, as is the current practice. All dredged material will be placed into five semi-confined open water PAs (SPPA 2 thru 5 and Pelican Island PA), two semi-confined (SPPA 1 and 1A) and two upland PAs on Shoal Point (PA5 and PA6) to be provided by the non-Federal sponsor, and two existing (PA 2A and 2B) and one new open-water PA (2C) on the north side of the Texas City Dike.

The recommended plan is not the NED Plan. The NED Plan is the currently authorized, but not constructed, channel depth of 50 feet. ER 1105-2-100 indicates that if a Non-Federal Sponsor may not be able to afford or support the NED, projects may deviate from it. In this case, the Non-Federal Sponsor requested that the channel depth be increased to 45 feet, not 50 feet, primarily due to the cost. Table 24 presents the economic summary data for the recommended plan. (The economic analysis outlined in Table 24 was prepared using a $1.119 cost per standard gallon for fuel costs. This method of preparing the costs followed a USACE Headquarters (HQUSACE) guidance memo which is attached in Appendix H. Further information on utilizing this cost per gallon is discussed in Section 11.3).

Table 24
Plan Summary Data (April 2007) at 4.875 %

($1.119 per gal fuel cost)	
Channel Depth (ft):	45-foot
First Cost of Construction	$ 52,652,000
Interest During 2-Year Construction Period	$2,535,000
Non-Federal Associated Cost	$2,683,000
Archaeology Mitigation Cost	$1,108,000
Total Project Construction Cost	$59,001,000
Average Annual Construction Cost	$3,170,000
Average Annual O&M Incremental Cost	$139,000
Total Average Annual Cost	$3,309,000
Average Annual Benefits	$28,058,000
Net Excess Benefits	$24,749,000
BCR	8.5

11.3 DIVISION OF PLAN RESPONSIBILITIES/COST SHARING REQUIREMENTS

The project cost for determining the cost sharing requirements is based on the fully funded cost estimate. This differs from the cost estimate that was utilized for the economic analysis that determined project benefits and the BCR. This fully funded estimate utilized a current fuel market cost of $2.05 per standard gallon. A $1.119 cost per standard gallon was utilized in the economic analyses. This method of preparing the costs followed a HQUSACE guidance memo which is attached in Appendix H. Further information is below:

Recently, for purposes of economic analysis, estimation of fuel costs for dredge plant operation relied upon immediate-term or current spot market prices. The estimation of fuel costs for cargo vessel operations is based on a five-year moving average. The differing approaches to estimation are based on the assumption or principle that dredge plant costs are expected to be incurred in the relative near future, when a justified project is constructed, while cargo vessel operations costs are expected to be incurred during the project economic life (normally 50 years). In the latter case, the moving average is intended to smooth or reduce short-term or temporary spikes or market fluctuations in bunker costs for constant dollar price estimates applied for present valuation of project benefit streams over the project economic life. Based on this logic, dredge plant and cargo vessel bunkerage costs will almost certainly be different but the margin between the estimates is usually not so pronounced as with the volatility exhibited in the energy markets over this past year (2005-2006).

HQUSACE and the Institute for Water Resources, developed a price adjustment applicable to existing estimates of inland vessel bunkerage costs for approximation of deep-draft or coastal dredge plant costs. What resulted is the recommended estimate of $1.119 per standard gallon for estimation of dredge bunkerage costs for the economic analyses. The current market costs should be utilized for the development of the fully funded project cost estimate. The $2.05 per standard gallon fuel cost was used in developing costs for Tables 25 and 26.

Two costs were developed for evaluation of the selected plan. These costs include the Project Cost (First Cost of Construction) and Fully Funded Cost. Project Cost is the cost at current levels and does not include expected interest during construction, or expected price escalation totals. Project Cost for all project components is $54,490,000. This total, as well as interest during construction, total average annual costs, and non-Federal associated costs are indicated in Table 25.

Table 25
Project Cost Summary for the Selected Plan at 4.875%
($2.05 per gal fuel cost)

First Cost of Construction	$54,490,000
Interest During 2-Year Construction Period	$2,624,000
Non-Federal Associated Cost	$2,683,000
Cultural Resource Compliance Cost	$1,108,000
Total Project Construction Cost	$60,905,000
Average Annual Construction Cost	$3,272,000
Average Annual O&M Incremental Cost	$139,000
Total Average Annual Cost	$3,411,000

Project Costs and price escalation (calculated by estimating the mid-point of the proposed contracts) are combined to create the Fully Funded Cost. The Fully Funded Cost for all project components are separated into expected non-Federal (25%) and Federal (75%) cost shares and detailed in Table 26. The $4,494,500 cost for the preparation of the GRR is not included in Table 26. The sponsor is aware the cost for preparation of the GRR will be included in the construction costs and shared at a 25% - 75% split.

Table 26
Texas City Channel 45-Foot Project Fully Funded Cost Allocation

General Navigation Features (GNF)	**Non-Fed Costs (25%)**	**Federal Costs (75%)**	**Total Costs**
Channel Deepening and Widening	$ 8,258,250	$24,774,750	$33,033,000
Placement Areas	$ 4,800,000	$14,399,000	$19,199,000
Cultural Resource Data Recovery	$ 0*	$ 400,000	$ 400,000
Engineering & Design	$ 626,000	$ 1,880,000	$ 2,506,000
Construction Management	$ 423,000	$ 1,268,000	$ 1,691,000
General Items (navigation aids, bond cost)	$ 414,000	$ 1,243,000	$ 1,657,000
Fully Funded Total (GNF)	$14,521,250	$43,964,750	$58,486,000

* The cost estimate for the cultural resource data recovery does not exceed 1% of the fully funded total project cost. Therefore, there is no cost share requirement.

Section 101 of Public Law 99-662 requires on each of the project components the Non-Federal Sponsor will be responsible for payment of 10 percent of the GNF costs (minus costs for lands, easements, rights-of-way and relocation (LERR)) due within 30 years of the completion of the project. This project has no LERR costs or costs for removal of pipelines. Other associated project costs include a non-Federal cost of $2,683,000 for the dredging of private docks (an estimated 268,300 cy @ $10.00 per cy). Associated costs for dredging the berthing areas do not include expected Operations & Maintenance (O&M) costs for those areas. The costs associated with providing additional capacity in PAs to accommodate O&M material dredged from berthing areas is a 100 percent Non-Federal Sponsor cost. Expected cost sharing for all project components is compliant with PGL 47, Cost Sharing for Dredged Material Disposal Facilities and Dredged Material Disposal Facility Partnerships.

The maintenance of the project features will be funded through annual appropriations of the Operations and Maintenance program. Construction General funding will fund all project construction components. The actual amounts would vary on a year-to-year basis because of variability in the volume of material removed during each dredging cycle and the variability of the cycles.

11.4 COMPARISONS TO AUTHORIZED PLAN

Funding Since Authorization

Table 27

Funding History of Texas City (GI-PED)		
FY	**Amount ($000)**	**Cumulative Amount ($000)**
FY 86	287.0	287.0
FY 87	800.0	1,087.0
FY 88	550.0	1,637.0
FY 89	169.5	1,806.5
FY 97	25.0	1,831.5
FY 02	157.0	1,988.5
FY 03	375.5	2,364.0
FY 04	454.0	2,818.0
FY 05	986.0	3,804.0
FY 06	894.0	4,698.0

Changes in Scope of Authorized Project

Work authorized, but not constructed, by WRDA 1986 included deepening the Texas City Turning Basin to 50 feet, enlarging the 6.7-mile long Texas City Channel to 50 feet by 600 feet, deepening the Bolivar Roads Channel and Inner Bar Channel to 50 feet, deepening the Outer Bar and Galveston Entrance Channels to 52 feet, and extending the Galveston Entrance Channel to a 52-foot depth for 4.1 miles at a width of 800 feet and an additional reach at a width of 600 feet to the 52-foot contour in the Gulf of Mexico. Establishment of 600 acres of wetland and development of water-oriented recreational facilities on a 90-acre enlargement of the Texas City Dike were also authorized but never constructed because the Non-Federal sponsor, the City of Texas City was unable to secure funding to initiate plans and specifications in 1989. In this case, the Non-Federal Sponsor requested that the channel depth be decreased to 45 feet, not 50 feet, and the width remain 400-foot primarily due to the cost. Deepening and widening of the Houston/Galveston Ship Channel addressed the requested channel to the Gulf of Mexico.

Changes in Project Purpose

The primary purpose of the Texas City Channel Deepening Project has not changed, improving the navigational efficiency and safety of the existing waterway for movement of commerce is still the primary purpose of the project.

Changes in Local Cooperation Requirements

Currently no changes in the local cooperation requirement exist.

Change in Location of Project

Project location remains unchanged.

Design Changes

In 2001, the City requested deepening the channel to 45 feet to accommodate commerce demand. The City did not request deepening the channel to the authorized depth of 50 feet due to potential high project costs and environmental concerns.

Changes in Cost Allocation

There are no changes in cost allocation for project purposes between the authorized project and the recommended plan.

Changes in Cost Apportionment

The non-Federal costs for the authorized project are $50,000,000 and the Federal costs are $150,000,000. The non-Federal costs for the recommended plan are $14,521,000 and the Federal costs are $43,965,000.

12.0 PUBLIC INVOLVEMENT, REVIEW AND CONSULTATION

12.1 OVERVIEW

Public input is important in the overall planning process to assure that plans considered and developed are compatible with community and regional objectives. The primary purposes of public involvement are: 1) to allow the public the opportunity to provide timely information to USACE so that developed plans will reflect their preferences to the greatest extent possible and 2) to provide a method by which USACE can inform the public so that those who choose to participate in the project formulation and the planning process can do so with a relatively complete understanding about the issues, opportunities and consequences associated with a study.

The following are a list of preparers of the Texas City Channel Deepening Project General Revaluation Report and Supplemental Environmental Assessment:

NAME	DEGREE	PROFESSIONAL DISCIPLINE	YEARS OF EXPERIENCE
Sharon Tirpak	B.S. Marine Biology	Project Manager	26.5
Jake Walsdorf	Landscape Architecture	Landscape Architecture	20
Kristy Morten	B.S. Biology	Environmental Specialist	28
Nicole Minnichbach	M.S. Anthropology	Staff Archeologist	19
Gloria Appell	M. S. Economics	Economics	26
Clark Colquitt	B.S. Civil Engineering	Coastal Engineer	30
Tim Few	B.S. Civil Engineering	Civil Engineer, Geotechnical	28
Jon Plymale	B.S. Civil Engineering	Design Project Engineer	27
Brenda Hayden	B.S. Mechanical Engineering	Civil Engineer, General Engineering	20
Ishaq Syed	B.S. Civil Engineering	Hydraulic Engineer	35

12.2 PUBLIC VIEWS AND RESPONSES

A Public Scoping Meeting was held on June 22, 2004, to provide the public with an opportunity to present their views, opinions and recommendations concerning the Texas City Channel General Reevaluation Study. The meeting was also held to help USACE and the City of Texas City identify environmental concerns, study efforts and meet the NEPA requirements for preparing an Environmental Assessment

The following is a list of the main concerns, problem areas or support expressed in the meeting:

- Encourage the beneficial use of dredged material for the construction of artificial bird islands within the project site and including the Swan Lake area (located south and west of the project site).

- Expression of support for the proposed deepening to -45 feet.

In June 2005 a meeting was held with the Texas City Dike Commission to discuss the proposed groins that are to be placed on the north side of the dike. The purpose of the groins is to slow down or prevent some sedimentation transport from the north side of the dike back into the Texas City Channel. The only comment expressed at the meeting was from an adjacent business owner concerned about the loss their business might take due to fishermen fishing off the groins instead of their fishing pier.

12.3 ADDITIONAL REQUIRED COORDINATION

To identify and address any issues associated with the Texas City Channel Deepening Project the USACE contacted the TCEQ, TXDOT, EPA, USFWS, NMFS, TxGLO and the TPWD, and formally contacted the USFWS and the NMFS. Response letters were received from the NMFS and the USFWS (Appendix E). Interagency work groups were formed to address issues associated with the Shoal Point Container Terminal project, which included the Texas City Channel Deepening Project. Agency issues and responses are documented in Section 6.3 of the EIS and are incorporated in this EA by reference.

12.4 COMPLIANCE WITH APPLICABLE LAWS

Throughout the course of developing the Shoal Point EIS and the Texas City Channel Deepening Project GRR, a variety of methods were used to acquire agency coordination and consultation. This GRR and EA have been prepared to satisfy the requirements of all applicable laws and regulations. The document has been prepared to comply with USACE regulation ER 200-2-2, Council on Environmental Quality (CEQ): Procedures for Implementing NEPA (30 CFR 230) and the CEQ, NEPA regulations (40 CFR Part 1500). The following is a brief discussion of environmental review and consultation requirements applicable to this project:

<u>National Environmental Policy Act.</u> The document has been prepared in accordance with CEQ regulations to aid in complying with NEPA. The environmental, economic, and social consequences of the recommended plan have been analyzed in accordance with the Act and presented in the report.

<u>Fish and Wildlife Coordination Act of 1958, as amended.</u> The recommended plan has been coordinated with the USFWS, TPWD and other appropriate resource agencies throughout the

reevaluation studies. The USFWS has provided input on the channel deepening and PA plans. The USFWS has provided a Planning Aid Letter for the study.

Magnuson-Stevens Fishery Conservation and Management Act (Public Law 104-297). The recommended plan is expected to be beneficial to EFH. The temporary loss of productive EFH during construction of the PAs will have temporary adverse impacts on adult and juvenile brown and white shrimp and red drum. However, the establishment of bay bottom structure and new emergent marsh areas will benefit these species by creating new intertidal marsh habitat. NMFS recommended conservation measures to ensure minimal impacts to EFH and to insure consistency with the EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act that are incorporated into the project.

National Historic Preservation Act of 1966, as amended. The effect of the recommended plan has been taken into account as required by Section 106 of the Act. Additional marine investigations are being conducted on the USS *Westfield* and for the proposed PA 2C and groin construction at the Texas City Dike. The USACE has negotiated a Programmatic Agreement under 36 C.F.R. 800.14(b) to specify action which will be taken by USACE prior to or during the project construction period to mitigate adverse effects.

Clean Water Act, as amended. Section 404 of the CWA regulates the discharge of dredged or fill material into waters of the United States. A 404(b)(1) evaluation of the proposed activity was prepared and is included in Appendix C. A Section 401 State Water Quality Certification for this action has been obtained from TCEQ to comply with the Act. The proposed plan will include Section 402(p) requirements of the CWA where applicable.

Clean Air Act. The recommended plan is expected to be consistent with the Clean Air Act and EPA's General Conformity Rule. A preliminary analysis of air emissions for the proposed project was done to determine if construction would generate NOx and VOCs emissions (ozone precursors) above the *de minimis* levels specified in the General Conformity Rules as established by the Clean Air Act for the Houston Galveston Non-attainment Area (HGB). The HGB is currently classified as a moderate non-attainment area for ozone under the 8-hour standard. The results of the air conformity analysis are presented in Appendix D. Air conformity modeling was conducted in support of the determination and coordinated with TCEQ. By letter dated May 25, 2007, TCEQ concurred that the proposed action is in conformity with the Clean Air Act.

Coastal Zone Management Act, As Amended.
A TCMP consistency determination was submitted to the TxGLO during development of the EIS and the project was found consistent in September 2002. Consistency was sought for the Texas City Channel Deepening Project for construction of features not included in the SPCT determination, and by letter dated February 27, 2007, the Coastal Coordination Council determined that the proposed project is consistent with the Texas CMP.

Endangered Species Act, as amended. A Biological Assessment was prepared and coordinated with USFWS and NMFS who concurred that the proposed project will have no effect on any federally listed species or critical habitat under their jurisdiction.

Marine Mammal Protection Act of 1972. Passed in 1972 and amended through 1997, this act is intended to conserve and protect marine mammals, establish a marine mammal commission, establish the International Dolphin Conservation Program, and establish a Marine Mammal Health and Stranding Response Program. The recommended plan is in compliance with this Act.

Noise Control Act. This Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. Each Federal agency is required to limit noise emissions to within compliance levels. The recommended plan is in compliance with this Act.

Executive Order 11990, Protection of Wetlands. This EO directs Federal agencies to avoid undertaking or assisting in new construction located in wetlands, unless no practical alternative is available. The recommended plan will not impact wetlands, but will create approximately 1000 acres of emergent marsh.

EO (Executive Order) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations. This EO directs Federal agencies to achieve EJ by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority and low income populations. The recommended plan will not have disproportionate adverse human health or environmental impacts on minority or low-income population groups within the project area.

Executive Order 13186, Responsibility of Federal Agencies to Protect Migratory Birds. This EO directs Federal agencies to increase their efforts under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Acts, the Fish and Wildlife Coordination Act, the ESA of 1973, NEPA of 1969 and other pertinent statutes as they pertain to migratory birds to avoid measurably negative take of migratory bird populations. The recommended plan has been reviewed for compliance with the EO and is not expected to impact migratory bird populations.

Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). As amended by SARA of 1986, provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment and cleanup of inactive hazardous substances disposal sites. 42 U.S.C. 9620 provides that Federal facilities and agencies must comply with the requirements of CERCLA, including the sale or transfer of real property must include a declaration of the type, quantity and time for which any hazardous substance was stored released or disposed on the property. A survey was conducted for CERCLA material and none was located within the project footprint.

Resource Conservation and Recovery Act (RCRA). This Federal law governs the management and disposal of solid waste. RCRA may impose substantial requirements on Federal projects that manage even small amounts of hazardous waste. A survey was conducted for RCRA material and none was located within the project footprint.

13.0 RECOMMENDATIONS

It is recommended that the existing project for the Texas City Channel, Texas, authorized by Section 201 of the WRDA of 1986, Public Law 99-662, dated November 17, 1986 be modified generally as described in this report as the Recommended Plan, with such modifications as in the discretion of the Chief of Engineers may be advisable, and subject to cost-sharing and financing arrangements satisfactory to the President and the Congress, to provide deep-draft channel improvements to the Texas City Channel for the deepening and continued maintenance.

The project cost of all project components, minus inflation and interest during construction, totals $54,490,000. The total investment cost of all components totals $60,905,000 and includes $54,490,000 in project costs, $2,624,000 in interest during construction for project components, and $2,683,000 in associated costs, and $1,108,000 in mitigation costs. Total average annual costs for the project are $3,272,000. The fully funded cost of the project, which includes project costs and expected escalation, totals $58,486,000. (A $2.05 per standard gallon fuel cost was used for these calculations. See Section 11.0, RECOMMENDED PLAN, COMPARISON TO AUTHORIZED PLAN AND PROJECT IMPLEMENTATION, for further details).

These recommendations are made with the provisions that, prior to implementation of the recommended improvements, the Non-Federal Sponsor shall enter into binding agreements with the Federal government to comply with the following requirements:

For the navigation improvements allocated to the Texas City Channel, the City of Texas City shall:

a. Provide, during the period of construction, a cash contribution equal to the following percentages of the total cost of construction of the general navigation features (which include the construction of land-based and aquatic dredged material disposal facilities that are necessary for the disposal of dredged material required for project construction, operation, and maintenance, and, for which a contract for the Federal facility's construction or improvement was not awarded on or before October 12, 1996):

1) 10 percent of the costs attributable to dredging to a depth not in excess of 20 feet; plus

2) 25 percent of the costs attributable to dredging to a depth not in excess of 45 feet

b. Pay with interest, over a period not to exceed 30 years following completion of the period of construction of the project, up to an additional 10 percent of the total cost of construction of general navigation features. The value of lands, easements, rights-of-way, and relocations provided by the Non-Federal Sponsor for the general navigation features, described below, may be credited toward this required payment. If the amount of credit exceeds 10 percent of the total cost of construction of the general navigation features, the Non-Federal Sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of lands, easements,

b. Provide all lands, easements, and rights-of-way, and perform or ensure the performance of all relocations determined by the Federal Government to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the general navigation features (including all lands easements, and rights-of-way, and relocations necessary for dredged material disposal facilities);

c. Accomplish all removals determined necessary by the Federal Government other than those removals specifically assigned to the Federal Government;

d. Provide the non-Federal share of that portion of the costs of mitigation and data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized to be appropriated for the project, in accordance with the cost sharing provisions of the agreement;

e. Provide, operate, maintain, repair, replace, and rehabilitate, at its own expense, the local service facilities of the Texas City Channel in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal Government;

f. Do not use Federal funds to meet the Non-Federal Sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized;

g. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the Non-Federal Sponsor, now or hereafter, owns or controls for access to the project for the purpose of inspecting, operating, maintaining, repairing, replacing, rehabilitating, or completing the project;

h. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors;

j. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended (42 U.S.C. 9601-9675), that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for the initial construction, periodic nourishment, operation, and maintenance of the project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the Non-Federal Sponsor with prior specific written direction, in which case the Non-Federal Sponsor shall perform such investigations in accordance with such written direction;

k. Assume, as between the Federal Government and the Non-Federal Sponsor, complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the initial construction, periodic nourishment, operation, or maintenance of the project;

l. To the maximum extent practicable, operate, maintain, and repair the project in a manner that will not cause liability to arise under CERCLA;

m. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents, and other evidence is required, to the extent and in such detail as will properly reflect total costs of construction of the Project, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR) Section 33.20;

n. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended (42 U.S.C. 1962d-5), and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2213), which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the Non-Federal Sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

o. Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army", and all applicable Federal labor standards and requirements, including but not limited to 40 U.S.C. 3141- 3148 and 40 U.S.C. 3701 – 3708 (revising, codifying and enacting without substantial change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a et seq.), the Contract Work Hours and Safety Standards Act(formerly 40 U.S.C. 327 et seq.) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c et seq.); and,

p. Comply with all applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended (42 U.S.C. 4601-4655), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, necessary for the initial construction, periodic nourishment, operation, and maintenance of the project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

Construction of the recommended channel improvement is estimated to take two years to complete. During this period, the Government and the Non-Federal Sponsor shall diligently maintain the projects at their previously authorized dimensions according to the previous cooperation agreement. Maintenance materials that have accumulated in the channel at the time that "before dredging" profiles are taken for construction payment shall be considered as part of the project and cost-shared according to the new cooperation agreement. Any dredging in a construction contract reach after the improvement has been completed and the construction contract closed will be considered to be maintenance materials and cost-shared according to the new agreement.

Those portions of the project for Texas City Channel deepened to 45 feet shall be operated and maintained according to the terms and provisions of the new agreement. All other portions of the existing projects for Texas City Channel shall continue to be operated and maintained according to the existing agreement applicable to each channel segment.

The recommendations contained herein reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a National Civil Works construction program or the perspective of higher review levels with in the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for implementation funding.

4 OCT 2007
Date

David C. Weston
Colonel, Corps of Engineers
District Commander

Texas City Channel Deepening Project
General Reevaluation Report and
Environmental Assessment
October 2007

Appendix A
Economic Appendix

APPENDIX A

Economic Appendix

This appendix presents the economic benefit analysis for the Texas City Channel Deepening Project Draft General Reevaluation Report (GRR). Per ton transportation costs for channel depth alternatives of 43, 44, 45, 48, and 50 feet were compared with the existing 40-foot channel depth costs. Project benefits were calculated for a 50-year period of analysis at the FY2007 Federal discount rate of 4.875 percent. Vessel operating costs used for the analysis were obtained from FY2005 Economic Guidance Memorandum (EGM) 05-01. The calculated benefits are directly related to the reductions in transportation costs stemming from more efficient vessel loading and a higher utilization of larger vessels.

The without project condition is defined by a 45-foot project depth from the Gulf of Mexico offshore entrance through the inner bar channel to its common junction with the Houston and Texas City channels near Bolivar Roads. A 45-foot authorized project depth to Houston was completed from the offshore entrance through the Bolivar Roads Channel, across Galveston Bay and inshore to Boggy Bayou as part of the Houston-Galveston Navigation Project in 2003. Completion of the 45-foot channel to Houston prompted renewed interest by the non-Federal sponsor in accelerating consideration of a 45-foot project depth to the Texas City inner harbor. The WRDA of 1986 authorized a 50-foot project depth for the Texas City Channel. The 1986 authorization provided for 50-foot project depth from the offshore entrance channel through the Texas City inner harbor. The project was put on hold in 1989 because the non-Federal sponsor was unable to secure construction funding. At present, the non-Federal sponsor's stated interest is limited to a project depth of 45 feet. However, in accordance with Corps' planning guidance, depths less than 45 feet were evaluated in order to ensure that net excess benefits were not optimized at depths less than 45 feet. Additionally, benefits and costs were calculated for channel depth alternatives over 45 feet in order to help determine if net excess benefit were optimized at depths greater than 45 feet.

For the current analysis, Texas City's historic traffic was evaluated to identify the percentage of tonnage currently or anticipated to be limited by the constraints of the existing and the without-project future channel dimensions. Within the context of this framework, channel constraints were identified when a percentage of the tonnage associated with a commodity group is currently or anticipated to be transported in vessels that cannot be fully loaded. The historic data shows that a significant share of the vessels used in the transport of crude petroleum could be loaded to depths over 40 feet. In addition, but to a lesser extent, examination of the vessels sizes, loaded drafts, design drafts, and parcel sizes revealed that vessels used to transport petroleum products are either currently constrained or anticipated to be constrained in the future by the existing 40-foot channel depth. Constraints associated with current vessel sizes were identified as the primary initial criterion in evaluating potential shifts to loading vessels more fully or to the transition of tonnage to larger vessels. Secondly, vessel fleet trends and channel depths and dock accommodation constraints were evaluated.

Historical Traffic Base

The Texas City Channel complex contains 34 waterfront facilities. Six large industrial entities operate and/or jointly operate a total of 15 facilities equipped to handle crude oil and petroleum and chemical products. The location of all facilities serving draft-constrained vessels is between miles 5.5 and 6.0 of the channel. There are two refineries, British Petroleum (BP) and Valero and three terminals receiving crude oil. The third terminal is Seaway Pipeline Company which transmits crude oil from Texas City to the Midwest. As of January 1, 2007[4], the BP refinery was the U.S.'s fourth largest oil refinery with a capacity of 417,000 barrels per calendar day. Valero's refinery capacity was 218,000 barrels per calendar day, and it ranked 30th among U.S. refineries. Texas City's three crude petroleum terminals can accommodate tankers in excess of 150,000 Deadweight Tons (DWT). The remaining facilities handle liquid bulk materials and dry cargoes.

In 2005, Texas City ranked 10th among U.S. ports in terms of tonnage, with tonnage totaling 57.8 million. Table 1 presents Texas City 1990-2005 total tonnage and principal deep-draft movements. Over 80 percent of 2005 tonnage consisted of deep-draft ocean-going movements, primarily crude petroleum imports. The remaining 20 percent, 10.9 million short tons, consisted of shallow-draft GIWW traffic. Approximately 80 percent of 2000-2005 crude oil tonnage was shipped in vessels greater than or equal to 90,000 DWT, with median design drafts of 45 feet. Additionally, nearly 75 percent of crude oil tonnage was shipped in vessels with loaded drafts greater than 36 feet[5]. Transits generally consist of one-way traffic for deep-draft piloted vessels and two-way traffic for inland waterway tows. Shallow-draft barge traffic moves between Texas City and the GIWW and from there to links with other U.S. Gulf Coast ports and the inland waterway system. Inland waterway barge traffic generally moves in 2-3 barge tows. Maximum tow sizes are 1,180 feet long. Approximately 19 percent of Texas' GIWW and 11 percent of GIWW total tonnage is linked to Texas City.

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[4] U.S. Department of Energy, Energy Information Administration, http://tonto.eia.doe.gov/dnav/pet/pet_pnp_unc_dcu_nus_m.htm

[5] U.S. Army Corps of Engineers, Waterborne Commerce of the United States, Navigation Data Center, detailed data files.

TABLE 1
Texas City Channel Tonnage by Major Commodity Group (1000's of short tons)

	Major Deep-Draft Commodities					Major	Ocean-	
	Crude Oil	Petroleum Products		Chemical Products		Group	Going	Total
Year	Imports	Imports	Exports	Imports	Exports	Total	Total	Tonnage a/
1990	25,184	480	1,166	320	618	27,768	34,003	48,071
1991	20,348	326	1,876	195	658	23,403	29,500	43,290
1992	26,435	448	1,181	249	1,101	29,414	29,778	43,104
1993	33,111	291	1,470	386	736	35,994	40,536	53,653
1994	22,863	445	274	275	537	24,394	30,068	44,351
1995	27,781	962	506	1,003	528	30,780	35,607	50,403
1996	31,901	500	1,365	429	890	35,085	41,208	56,394
1997	33,900	639	1,758	480	568	37,345	42,379	56,646
1998	27,958	237	1,633	255	1,149	31,232	37,134	49,477
1999	26,900	791	1,483	191	1,706	31,071	36,376	49,503
2000	34,646	1,519	2,871	519	1,533	41,088	47,797	61,586
2001	38,688	1,382	2,263	261	1,449	44,043	49,985	62,270
2002	32,864	2,326	1,540	451	1,155	38,368	43,524	55,233
2003	38,773	1,254	1,794	157	1,323	43,301	48,697	61,338
2004	42,845	3,175	3,082	189	1,281	50,572	55,509	68,283
2005	35,644	2,097	4,278	151	1,157	43,327	46,927	57,839
	1990-2005 Compound Annual Growth Rates							
	2.3%	10.3%	9.1%	-4.9%	4.7%	3.0%	2.2%	1.2%

Source: USACE, Waterborne Commerce of the U.S., Part 3, 1990-05.
a/ includes shallow-draft barge tonnage

During the most recent 3-year period (2003-2005) petroleum and chemical products, including crude oil, comprised 91 percent of Texas City's current deep-draft total and 73 percent of its total tonnage. As displayed in Table 2, over 40 million short tons of crude petroleum and petro-chemicals were transported annually through the port during the most recent 3-year period. Crude petroleum consistently dominated total tonnage, experiencing nearly a 40 percent increase from 1993-1995 to 2003-2005. Crude petroleum presently represents 63 percent of combined deep- and shallow-draft total.

TABLE 2
Texas City Channel Tonnage (1000's of short tons)
and Growth Rates by Movement Class

Major Deep-Draft Commodities (Crude Oil Imports, Petroleum-Chemical Imports/Exports) Year	Tonnage	Other Ocean-Going Tonnage	Shallow-Draft Tonnage
1990	27,768	6,235	14,068
1991	23,403	6,097	13,790
1992	29,414	364	13,326
1993	35,994	4,542	13,117
1994	24,394	5,674	14,283
1995	30,780	4,827	14,796
1996	35,085	6,123	15,186
1997	37,307	5,072	14,267
1998	31,242	5,892	12,343
1999	31,071	5,305	13,127
2000	41,088	6,709	13,789
2001	44,043	5,942	12,285
2002	38,308	5,216	11,709
2003	43,301	5,396	12,641
2004	50,572	4,937	12,774
2005	43,400	3,527	10,912
1990-2005 Compound Annual Growth Rates			
	3.0%	-3.7%	-1.7%

Source: USACE, Waterborne Commerce of the U.S., Part 3, 1990-2005

Table 3 displays 1990-2005 national and Texas City statistics for total ocean-going tonnage. Comparison of Texas City's 1990-2005 tonnage with U.S. tonnage reveals that Texas City's average annual growth rate of 2.2 percent for total deep-draft tonnage is over 53 percent higher than the national average annual growth rate of 1.5 percent (Table 3). In spite of declines in 2005 crude oil imports, Texas City's combined deep-draft tonnage generally maintained higher growth rates than the nation. It should be noted that the drop in Texas City's 2005 crude oil imports was primarily due to extended shutdowns for maintenance. Both Gulf Coast and U.S. crude oil imports declined in 2005 as well.

Texas City is contained in the U.S. Gulf Coast Petroleum Administration Defense District (PADD III). The PADD III includes the states of Texas, Louisiana, Arkansas, Mississippi, Alabama, and New Mexico. Table 4 presents a comparison of Texas City's crude petroleum imports and the port's share of the national and regional totals. Figure 1 provides graphical presentation. Although Texas City's crude oil imports exhibit more variance than the Gulf Coast region and the U.S. totals, exclusion of 2005 shows generally comparative growth rates between Texas City and the region and nation.

TABLE 3
U.S. and Texas City Total Deep-Draft Tonnage (1000's of short tons)

	U.S. Total Deep-Draft Tonnage			Texas City
Year	Foreign Imports & Exports	Coastwise and Lakewise	Deep Draft Total	Deep-Draft Total
1990	1,041,556	408,796	1,450,352	34,003
1991	1,013,557	397,972	1,411,529	29,500
1992	1,037,460	392,529	1,429,989	29,778
1993	1,060,041	381,571	1,441,612	40,536
1994	1,115,743	391,806	1,507,549	30,068
1995	1,147,357	382,739	1,530,096	35,607
1996	1,183,386	382,259	1,565,645	41,208
1997	1,220,616	385,880	1,606,496	42,379
1998	1,245,388	371,789	1,617,177	37,134
1999	1,260,771	342,689	1,603,460	36,376
2000	1,391,826	341,290	1,733,116	47,797
2001	1,344,086	323,608	1,667,694	49,985
2002	1,319,291	317,862	1,637,153	43,524
2003	1,378,115	313,234	1,691,349	48,697
2004	1,504,851	324,090	1,828,941	55,509
2005	1,498,700	309,900	1,808,600	46,927
	1990-2005 Compound Annual Growth Rates			
	2.5%	-1.8%	1.5%	2.2%

Source: USACE, Waterborne Commerce of the U.S., Part 3, 1990-2005

Since 1970, both Texas City and U.S. crude petroleum imports steadily rose as U.S. crude production fell and was replaced by foreign imports. Figure 2 illustrates the changing relationship between U.S. domestic production, foreign imports, and refinery input. The Energy Information Administration (EIA) is projecting continuing declines in U.S. production over the 2005-2030 forecast period, along with steady growth of imports. The EIA shows U.S. crude petroleum production declining from 5.18 million barrels per day in 2005 to 5.39 million barrels day in 2030, with a corresponding average annual compound growth rate of 0.2 percent. Over the forecast period, most of the production decrease is from anticipated declines in Alaskan output. Based on data presented in the EIA Annual Energy Outlook (AEO2007, February 2007), Alaskan production is projected to decrease from 0.86 million barrels per day in 2005 to 0.27 million barrels per day in 2030, with an annual rate of -4.7 percent.

TABLE 4

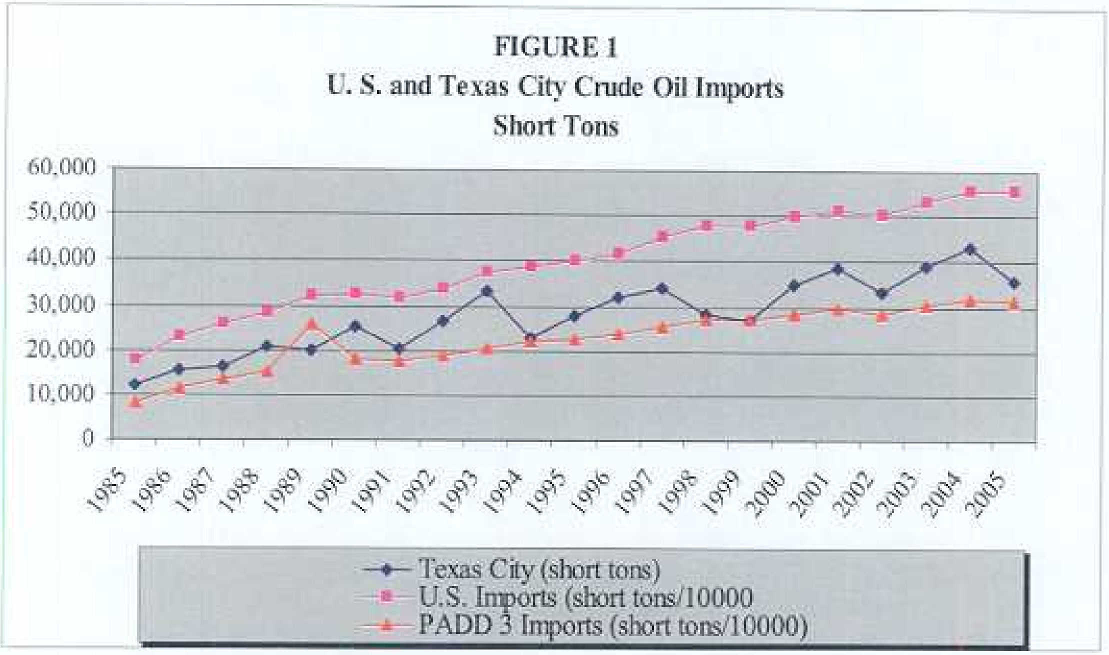
Comparison of Texas City and Regional and National Totals

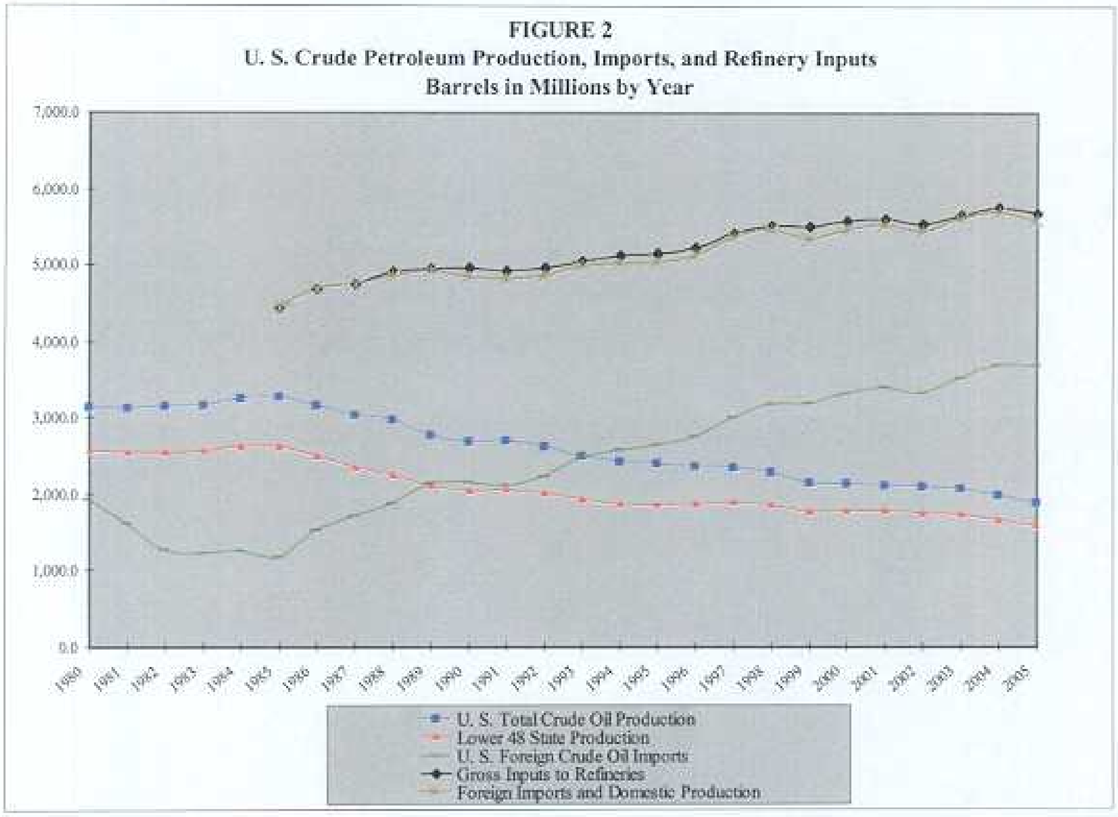
Crude Petroleum Imports (1000's of short tons)

Year	Texas City Imports	PADD III Imports	U.S. Total Imports	Texas City Percentage of PADD III	Texas City Percentage of U.S. Total
1990	25,184	178,052	322,433	14.1%	7.8%
1991	20,348	174,852	316,310	11.6%	6.4%
1992	26,435	184,871	333,666	14.3%	7.9%
1993	33,111	204,356	371,267	16.2%	8.9%
1994	22,863	221,020	386,381	10.3%	5.9%
1995	27,781	222,164	395,484	12.5%	7.0%
1996	31,901	237,708	411,824	13.4%	7.7%
1997	33,900	252,270	449,961	13.4%	7.5%
1998	27,958	267,175	476,231	10.5%	5.9%
1999	26,900	270,491	477,592	9.9%	5.6%
2000	34,646	281,170	497,547	12.3%	7.0%
2001	38,688	292,859	510,298	13.2%	7.6%
2002	32,897	282,226	499,999	11.7%	6.6%
2003	38,773	300,325	528,703	12.9%	7.3%
2004	42,845	316,402	550,638	13.5%	7.7%
2005	35,644	310,493	550,392	11.5%	6.4%
	1990-2005 Compound Annual Growth Rates				
	2.3%	3.8%	3.7%	-1.4%	-1.3%

Source: U.S. Army Corps of Engineers and Energy Information Administration.

In addition to growth in crude petroleum, Texas City refined petroleum products experienced high growth. Petroleum product import and export tonnage increased from 1.6 million short tons in 1990 to 6.4 million in 2005 (Table 1). Highest import growth was attributable to distillate fuel. Export growth is primarily attributable to petroleum coke and distillate fuel. Table 5 displays Texas City's 1995-2005 commodity specific petroleum product imports and exports. Examination of the vessel characteristics and geographic routings associated with Texas City's products suggests that a portion of tonnage would benefit from channel depths over 40 feet. Specific details related to the percentage of tonnage by vessel size and associated trade routes are presented later in the report.





Source: U.S. Army Corps of Engineers, Waterborne Commerce of the U.S. and U.S. Energy Information Administration.

TABLE 5

Texas City Channel Petroleum Products 1995-2005

Import and Export Tonnage (1000's of short tons)

Petroleum Product Imports

Major Group	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Gasoline	0	0	0	2	0	12	5	29	131	233	244
Naphtha & solvents	222	0	122	80	101	191	142	329	193	339	0
Distillate fuel oil	235	57	24	34	114	677	585	1,080	740	2,308	1,341
Residual fuel oil	104	260	414	111	508	512	505	813	171	253	508
Lube oil	221	106	8	3	1	58	143	72	16	0	4
Petroleum Coke	26	0	0	0	0	0	0	0	0	0	0
Liquid Natural Gas	142	68	68	8	0	68	2	0	0	0	0
Other Petroleum Products	12	9	3	0	67	1	0	3	3	41	0
Total Imports	962	500	639	238	791	1,519	1,382	2,326	1,254	3,174	2,097

Petroleum Product Exports

Major Group	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Petroleum coke	274	1,022	942	1,120	791	2,029	1,205	861	884	1,603	2,505
Naphtha & solvents	1		15	114	61	32	0	14	359	138	54
Distillate fuel oil	50	80	374	188	96	221	736	257	265	698	1,230
Residual fuel oil	53	12	192	99	149	392	197	142	123	0	118
Lube oil & greases	11	15	0	17	78	9	3	27	0	7	0
Kerosene	0	190	183	0	45	159	45	0	44	0	78
Gasoline	56	21	0	77	189	24	64	270	119	542	288
Liquid Natural Gas	7	0	15	0	0	4	6	3	0	0	0
Other Petroleum Products	54	24	47	18	69	1	7	7	0	9	5
Total Exports	506	1,364	1,768	1,633	1,478	2,871	2,263	1,581	1,794	2,990	4,278

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the U.S., Part 2, 1995-2005.

Along with increasing volumes of petroleum product imports and exports, a relatively steady volume of domestic coastwise product tankers utilize Texas City. Texas City's domestic coastwise movements primarily consist of gasoline, distillate, kerosene, and jet fuel. Table 6 presents specific petroleum product group distributions. As with crude petroleum imports, coastwise petroleum product movements were affected by the Texas City refinery shutdowns of 2005. Coastwise shipments for 2003-2005 averaged nearly 3.3 million. Coastwise receipts averaged 226 thousand short tons. Examination of the vessel characteristics and geographic routings associated with Texas City's coastwise traffic suggested that a portion of coastwise shipments would benefit from channel depths over 40 feet. These movements primarily consist of gasoline shipments to Florida.

Chemical import and export tonnages for 2003-2005 are 23 percent higher than 1993-1995 levels, with all increases attributable to exports. Chemical exports primarily consist of hydrocarbons, acids, and alcohols. In comparison to petroleum products, chemical import tonnage represents half the volume of petroleum products. In 2005, deep-draft exports of chemicals and allied products totaled 1.2 million short tons and imports 151 thousand. Annual imports for recent years total less than 300 thousand short tons. Table 7 presents Texas City's 1995-2005 commodity specific chemical import and export tonnage. Texas City's 2005 chemical exports represented approximately 2 percent of the U.S. total waterborne chemical exports. Review of the percentage shares for earlier periods showed that Texas City coastwise products represented 2 percent of U.S. total in 1990 and 1 percent in 1995 and 1997, with the 1995 and 1997 volumes representing period lows. In comparison, Texas City's 2005 chemical imports generally represented less than 1 percent of the U.S. total with imports declining in recent years. Channel deepening benefits for channel depths over 40 feet for chemical carriers are expected to be limited based on examination of vessel sizes, load patterns, and discussion with industry. Table 8 presents U.S. total petroleum and chemical product imports and Texas City's relative shares.

U.S. domestic coastwise chemical movements consist largely of hydrocarbons, acids, and alcohols, with coastwise shipments exceeding receipts. In 2005, coastwise shipments totaled 713 thousand short tons and receipts totaled 39 thousand short tons. Coastwise chemical movements represented 22 percent of Texas City's 2005 coastwise and petroleum products represented the remaining 88 percent.

TABLE 6

Texas City Total Coastwise Petroleum Products Distribution

By Major Commodity Type (1000's of short tons)

	Coastwise Petroleum Product Shipments										
Major Group	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Gasoline	2,947	3,004	3,094	3,047	2,574	2,726	3,133	2,262	3,000	2,404	1,684
Distillate Fuel Oil	135	415	222	612	558	1,352	761	748	850	735	550
Residual Fuel Oil	25	131	64	142	11	41	313	62	16	19	54
Naphtha & Solvents	33	19	0	0	28	150	0	0	18	114	22
Petroleum Coke	0		223	445	123	113	101	0	38	272	34
Petroleum Products Nec.	11	18	0		393	661	249	14	20	0	86
Other Petroleum Products	0	11	3	163	0	0	21	6	21	10	11
Total Shipments	3,151	3,598	3,606	4,409	3,687	5,043	4,578	3,092	3,963	3,554	2,441

	Coastwise Petroleum Product Receipts										
Major Group	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Gasoline	12	0	0	0	0	19	0	11	67	0	2
Distillate Fuel Oil	20	85	44	63	158	93	83	127	225	96	4
Residual Fuel Oil	19	53	0	0	37	58	85	161	0	61	132
Naphtha & Solvents		0	0	0	0	15	0	0	0	13	35
Other Petroleum Products		0	4	2	3	34	5	12	0	0	43
Total Receipts	51	138	48	65	198	219	173	311	292	170	216

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the U.S., Part 1995-2005.

TABLE 7

Texas City Channel Chemical Products

Import and Export Tonnage (1000's of short tons)

Chemical Product Imports

Major Group	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Agric Fertilizer	116	59	20	2	23	0	20	0	0	0	0
Acyclic Hydrocarbons	53	13	15	21	26	86	50	47	30	29	14
Benzene & Toluene	40	11	7	5	14	55	20	42	12	31	52
Hydrocarbons	128	0	3	4	7	70	34	40	17	26	46
Alcohols	373	269	341	173	102	159	83	191	58	73	11
Carboxylic Acids	209	51	29	14	8	19	31	16	17	18	4
Organic-Inorganic Compounds	23	0	28	2	8	7	7	8	5	6	12
Ammonia	0	0	0	0	0	0	0	0	0	0	0
Plastics	23	12	17	10	0	0	0	2	0	0	0
Other Chemical Products	38	14	20	24	3	123	16	105	18	6	12
Total Imports	1,003	429	480	255	191	519	261	451	157	189	151

Chemical Product Exports

Major Group	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Agric. Fertilizer	172	365	135	125	46	38	0	27	11	0	0
Hydrocarbons	123	226	155	416	731	770	556	608	665	602	548
Alcohols	45	89	61	136	191	177	467	187	158	202	144
Carboxylic Acids	48	49	77	155	299	181	181	168	222	206	171
Nitrogen Functional Compounds	63	87	88	144	164	173	123	46	125	131	78
Organic-Inorganic Compounds	31	39	20	44	109	79	51	43	69	75	59
Sodium Hydroxide	5	18	0	0	3	9	10	16	0	15	13
Inorganic Elements, Oxides, Salts	0	0	0	0	74	37	5	3	2	6	63
Perfumes & Cleansers	1	1	1	29	5	3	0		0	2	1
Chemical Additives	7	12	4	32	33	13	5	33	18	18	18
Other Chemical Products	33	4	27	68	51	53	51	24	53	24	62
Total Exports	528	890	568	1,149	1,706	1,533	1,449	1,155	1,323	1,281	1,157

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the U.S., Part 3, 1995-2005.

TABLE 8

U.S. Total Petroleum and Chemical Products (1000's of short tons)

And Texas City Percentage Share of the U.S. Total

	Petroleum Products				Chemical Products			
	U.S. Imports	Texas City %	Exports *	Texas City%	U.S. Imports	Texas City %	U.S. Exports	Texas City %
1990	109,470	0.4%	30,785	3.8%	15,943	2.0%	40,462	1.5%
1991	96,085	0.3%	39,027	4.8%	15,293	1.3%	44,418	1.5%
1992	92,054	0.5%	37,973	3.1%	16,404	1.5%	42,216	2.6%
1993	99,236	0.3%	37,282	3.9%	18,955	2.0%	39,783	1.9%
1994	100,861	0.4%	33,305	0.8%	23,480	1.2%	44,933	1.2%
1995	78,166	1.2%	33,742	1.5%	24,067	4.2%	49,466	1.1%
1996	98,316	0.5%	33,412	4.1%	24,596	1.7%	47,474	1.9%
1997	104,167	0.6%	33,206	5.3%	25,056	1.9%	50,537	1.1%
1998	118,666	0.2%	30,442	5.4%	27,443	0.9%	51,345	2.2%
1999	124,049	0.6%	30,126	4.9%	28,141	0.7%	52,199	3.3%
2000	130,032	1.2%	32,125	8.9%	38,479	1.3%	57,888	2.6%
2001	134,307	1.0%	33,089	6.8%	43,830	0.6%	54,741	2.6%
2002	129,970	1.8%	32,201	4.8%	39,572	1.1%	54,962	2.1%
2003	145,792	0.9%	30,047	6.0%	42,007	0.4%	53,575	2.5%
2004	166,250	1.9%	33,076	9.3%	43,810	0.4%	60,734	2.1%
2005	162,479	1.3%	36,283	11.8%	45,517	0.3%	56,684	2.0%

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the U.S., Part 3, 1995-2005.

A substantial volume of inland waterway barges use Texas City, with recent tonnage averaging about 5 million short tons annually. Maximum loaded drafts for Texas City inland waterway barges are in the 9- to 12-foot range. Texas City's 2001-2005 inland waterway barge traffic by major commodity group is displayed in Table 9. The majority of tonnage represented by petroleum and chemicals Inland waterway product tonnage for the period 1990-2005 is also included in the column labeled "shallow-draft tonnage" in Table 2. The GIWW tonnage forecast released by the Institute for Water Resources in 2003 for the inland waterway users' group shows petroleum and chemical inland waterway average annual growth rates between 1 and 2 percent for the period between 1997/98 to 2003/2005; however, during recent years Texas City barge tonnage has increased positively but less than 1 percent.

TABLE 9

Texas City Inland Waterway Barge Shallow-Draft Tonnage Texas City to/from Gulf Intracoastal Waterway (GIWW)

Year	Petroleum Products	Chemical Products	Other Commodities a/	Total Tonnage
Inland Waterway Barge Shipments (1000's of short tons)				
2001	5,202	1,548	2	6,752
2002	5,271	1,445	2	6,718
2003	5,052	1,442	386	6,880
2004	4,756	1,403	635	6,794
2005	4,385	1,182	10	5,577
Inland Waterway Barge Receipts (1000's of short tons)				
2001	2,909	2,273	12	5,194
2002	2,650	1,995	17	4,662
2003	2,866	2,505	12	5,383
2004	1,722	2,597	1,262	5,581
2005	1,810	2,504	513	4,827

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the U.S., Part 2001-2005.
a/ 99% crude petroleum.

Other Port Development

In addition to its petroleum base, the City of Texas City was issued a permit for the private development of the Shoal Point Container Terminal in 2004. For purposes of the Federal project, and the GRR analysis, the operation of the container terminal is part of the without project future. As noted in the Shoal Point EIS, the container terminal is proposed to meet regional needs for development of a containerized cargo facility. The impetus for proposed development at Shoal Point is regional needs for additional container capacity within the Texas Central Gulf region, as well as projected growth in the Latin American market.

In terms of general container cargo trends and aside from the Texas City permit action, the American Association of Port Authorities shows that Houston container movements increased at an average annual rate of 8.5 percent between 2000 and 2005. Over the same period, West Coast container movements increased by 8.0 percent. The U.S. rate average annual growth rate for 2000-2005 was 6.7 percent and the Atlantic Coast rate was 5 percent.[6] Between 1999 and 2005, South and Central America container throughput increased at an average annual rate of 11 percent.

Analysis of vessel classes or sizes currently employed for container trade along the U.S. Gulf coast suggests that vessels ranging in size from approximately 2,400-3,700 twenty-foot equivalent unit (TEU) capacity would form the most frequent size augmented by vessels of Panamax class with capacities of approximately 3,900 to 4,850 TEUs. Utilization of Post-Panamax vessels is presently low on the Gulf Coast, and while their use is expected to increase in the future, the percentage of cargo utilizing depths over 40 feet is not conclusive.

Full utilization of containership with loaded drafts over 40 feet will be influenced by prior and post ports of call. Review of the loading patterns at other U.S. ports suggests that maximum channel depths of 40 to 43 feet may be sufficient based on near future vessel fleet requirements and associated maximum loaded vessel drafts. Depths of 50 feet or more are limited. U.S. container ports with project depths over 50 feet on the U.S. West Coast include Los Angeles/Long Beach and Oakland Harbor. Los Angeles/Long Beach has a project depth of 53 feet and Oakland Harbor which has a project depth of 50 feet. On the U.S. East Coast, the port of New York presently has a project depth of 45 feet and it is anticipated to have a 50-foot project depth by the year 2010. Additionally, Norfolk has a project depth of 50 feet. Channel deepening projects are also being evaluated for Charleston and Savannah Harbors.

Channel depth justifications for these projects required clear demonstration that the existing fleet could readily utilize the increased channel depth. Based on these considerations, and the large of petroleum on depth optimization, deepening benefits were not estimated for container cargo.

For purposes of the current GRR, transportation savings were not calculated for Texas City container cargo. The reasons for not including containers in the channel deepening benefits varied. First, National Economic Development (NED) transportation savings from the large crude petroleum and petroleum products base is huge in comparison to the anticipated NED benefits associated with containers, in particular for a new facility. The magnitude of

[6] Data complied from the American Association of Port Authorities, August 2007.
http://www.aapa-ports.org/files/Statistics/CONTAINER%5FTRAFFIC%5FCANADA%5FUS.xls

transportation cost benefits is particularly high because the offshore entrance channel has already been deepened to 45 feet as part of the Houston-Galveston Navigation Project, and the additional cost to dredge the Texas City Channel to depths over 40 feet is comparatively low. Additional considerations for not quantifying container benefits relate to uncertainties associated with the sailing drafts of the container vessels expected to utilize the project at the onset of the planning period. It is well recognized that Texas City has the advantages needed to capture a sizable portion of the Gulf Coast market area; however, the number of vessels that would benefit from channel depths in excess of 40 feet may be limited for the early portion of the economic planning period (2010-2060) given the loaded drafts of containerships circuiting the U.S. Gulf Coast. The need for channel depths in excess of 40 feet is generally limited to the first or last port visited on the foreign inbound or outbound leg of the containership routing itinerary. Quantification of the NED benefits would necessitate inclusion of a multiport analysis as part of the GRR. The remainder of this appendix focuses on Texas City's petroleum base tonnage, associated vessel utilization, refinery capacity, national petroleum import expectations, and quantification of channel deepening benefits for depths over the existing 40 feet.

Petroleum Vessel Fleet Expectations and Project Beneficiaries

Texas City's existing 40-foot project depth was designed to efficiently and safely accommodate vessels of approximately 40,000 DWT with loaded drafts of 36 feet. Since construction of the existing project in 1967, the size and draft of vessels in the world fleet have increased to meet the competitive demand for more efficient movements of bulk commodities, in particular crude petroleum and petroleum products. Examination of the vessel sizes used in the transport of crude petroleum and, to a lesser extent, petroleum products revealed that significant transportation savings could be realized from larger vessel loads in the Texas City Channel. For the current report, project benefits were calculated for crude petroleum imports, petroleum product imports and exports, and coastwise movements of petroleum products transported to docks adjacent to the Texas City Turning Basin[7]. The turning basin section of the Texas City Channel contains six docks that can receive crude petroleum, four of which can accommodate tankers in excess of 150,000 DWT. These docks receive all of Texas City's crude petroleum import tonnage and its draft-constrained product tankers. Initial investigations suggested that a significant percentage of Texas City's crude petroleum imports would immediately benefit from

[7] The issuance of the Shoal Point Container Terminal permit in 2004 and initiation of construction in 2005 will result in the introduction of containerships before the year 2010; however, the introduction of containerships with loaded drafts over 40 feet is not expected to affect plan optimization. The largest concentration of maximum loads for containerships is expected to be near 40 feet.

the 45-foot depth. Additionally, examination of the vessel sizes used for petroleum product imports and loading patterns at other Gulf Coast ports showed that up to 51 percent of product imports are transported in vessels with loaded drafts over 40 feet. Examination of Texas City's domestic coastwise petroleum product movements reveal that between 10 and 20 percent of domestic coastwise petroleum product tonnage are expected to utilize the 45-foot depth over the 2010-2060 period of analysis. Detailed examination of Texas City's 2001-2005 coastwise vessel traffic revealed that the percentage of coastwise traffic shipped in vessels with design drafts over 40 feet ranged from a low of 23 percent in 2004 and a high of 45 percent in 2003. The 2005 average was 33 percent. Expectations concerning the relationship between the proposed 45-foot project depths and the percentage of tonnage transitioning to more fully loaded drafts are subject to certain degrees of uncertainty, particularly in relationship to coastwise traffic. Some of the major variables affecting utilization are origin of shipment and trade route. Other variables, particularly relevant in the short-term, include vessel availability and vessel operating costs. Minimization of vessel operating costs is, of course, assumed to drive long-term vessel choices and, henceforth, contribute to some transitions. Discussion of the range of commodity-specific percentages used for the benefit calculations are presented in the following section.

Crude Petroleum and Energy Indicators

The U.S. Gulf Coast leads the nation in refinery capacity, with 41 percent of U.S. crude oil distillation capacity. Products, such as gasoline, heating oil, diesel, and jet fuel, are transported from the Gulf Coast to the East Coast and the Midwest. About one-half of the Gulf Coast refinery capacity is in Texas with the remainder in Louisiana. Texas City's refinery capacity represents 4.2 percent of the national total and 15 percent of the state total (Table 10). Current capacity is 722,750 barrels per calendar day (BPD), up by approximately 15 percent from 1994.

Texas City refinery trends are similar to other U.S. refineries including noted declines in capacity until the mid-nineties. The EIA notes that falling demand for petroleum and deregulation of the U.S. refining industry in the 1980s led to 13 years of decline in U.S. refinery capacity[8]. The trend toward declining U.S. capacity was reversed to some extent in the mid-1990s, and 2 million barrels per day of distillation capacity was added between 1996 and 2005.

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[8] http://www.eia.doe.gov/pub/oil_gas/petroleum/analysis_publications/oil_market_basics/Refining_text.htm
Distillation is the basis of the refining process. Crude oil is made up of a mixture of hydrocarbons; this first and basic refining process is aimed at separating the crude oil into its "fractions," the broad categories of its component hydrocarbons. Crude oil is heated and put into a still, a distillation column, and different products boil off and can be recovered at different temperatures. The lighter products, liquid petroleum gases (LPG), naphtha, and some gasoline are recovered at the lowest temperatures. Middle distillates, such as jet fuel, kerosene, distillates come next. Finally, the heaviest products (residuum or residual fuel oil) are recovered.

TABLE 10
Texas City Atmospheric Crude Oil Distillation Capacity and Percentage of State and National Totals

	Texas City Refinery Capacity *		
Capacity as of	Barrels/day	% Texas Total	% U.S.
1-Jan-94	626,500	14.0%	4.2%
1-Jan-99	657,000	15.7%	4.0%
1-Jan-00	661,000	15.6%	4.0%
1-Jan-01	661,000	15.4%	4.0%
1-Jan-02	713,000	15.9%	4.2%
1-Jan-03	724,000	16.7%	4.3%
1-Jan-04	713,000	15.9%	4.2%
1-Jan-05	718,950	15.5%	4.2%
1-Jan-06	722,750	15.4%	4.2%

* Texas City's atmospheric crude oil distillation capacity in January 2005 was 718,950 barrels per day, equals approximately 39,455,690 short tons. U.S. capacity was nearly 18 million barrels per day.
Source: U.S. Department of Energy, Energy Information Administration, extracted from detailed files.

Table 11 displays U.S. total annual crude petroleum refinery data for the period 1965-2006. The amount of crude petroleum imported into Texas City is dependent upon the area's capacity to refine crude and/or pipeline it to other refining complexes. Evaluation of Texas City's refinery capacity (Table 10) revealed that 2001-2005 crude petroleum import volumes represent over 95 percent of crude petroleum refining capacity. While this is high margin, the effect of efficiencies through bottle-necking[9], refinery expansion, substitution of imports for declining domestic production, and 30 percent of Texas City's waterborne crude being pipelined out of Texas City provides additional capacity.

[9] An upgrading procedure which results in the ability to process more crude than the nameplate size of the distillation unit would indicate. In such cases, a refinery is able to achieve a utilization rate greater than 100 percent for short periods of time.

TABLE 11
United States 1965-2006
Refinery Capacity and Utilization

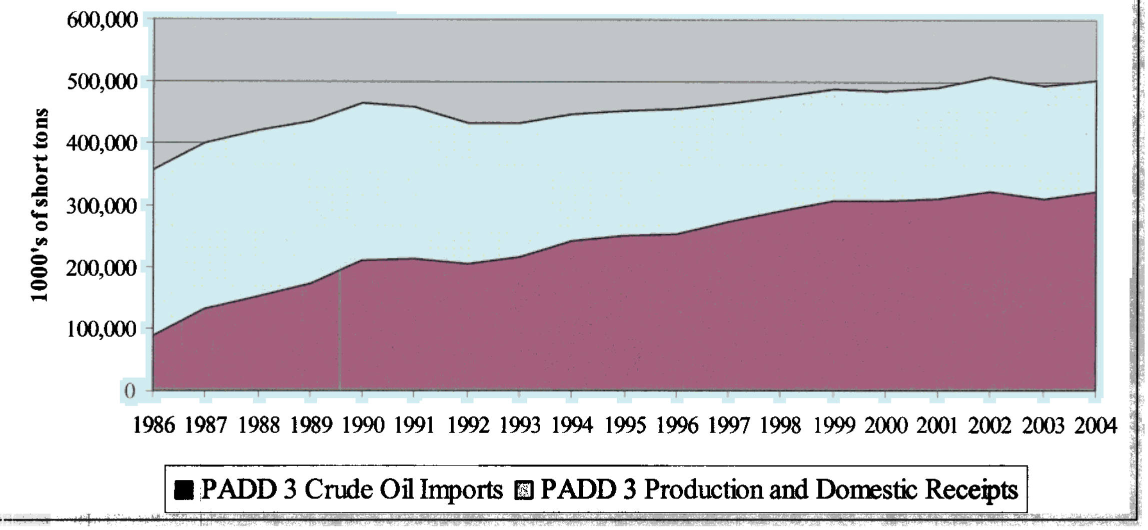
Year	Number of Operating Refineries	Refinery Capacity Barrels/Day	Gross Input to Distillation Barrels/Day	Operable Refineries Utilization Rate
1965	293	10,419,851	9,535,395	91.5%
1970	276	12,021,273	11,491,018	95.6%
1975	279	14,960,710	12,873,296	86.0%
1980	319	17,988,121	13,802,736	76.7%
1985	223	15,658,769	12,137,936	77.5%
1990	205	15,571,966	13,579,314	87.2%
1991	202	15,675,627	13,477,804	86.0%
1992	199	15,696,155	13,607,175	86.7%
1993	187	15,120,630	13,820,256	91.4%
1994	179	15,034,160	14,000,343	93.1%
1995	175	15,434,280	14,087,230	91.3%
1996	170	15,333,450	14,344,353	93.5%
1997	164	15,451,785	14,804,822	95.8%
1998	163	15,711,000	15,079,207	96.0%
1999	159	16,261,290	15,052,213	92.6%
2000	158	16,511,871	15,312,512	92.6%
2001	155	16,595,371	15,340,367	92.6%
2002	153	16,785,391	15,138,719	90.7%
2003	149	16,757,370	15,508,000	92.6%
2004	149	16,894,314	15,783,000	93.4%
2005	148	17,124,870	15,578,000	89.9%
2006	149	17,338,814	n/a	n/a
1980-1990 Average	249	16,406,285	13,173,329	80.5%
1991-1997 Average	182	15,392,298	14,020,283	91.1%
1998-2005 Average	154	16,580,185	15,349,002	92.6%

Source: U.S. Department of Energy, Energy Information Administration.
http://tonto.eia.doe.gov/dnav/pet/pet_pnp_unc_dcu_nus_a.htm

Two of Texas City's refineries have the additional capacity for 300,000 BPD, and the Texas City to Houston pipelines has over 200,000 BPD additionally capacity. These increases bring Texas City capacity to 1,218 MBD, equating to an annual volume of approximately 67 million tons. Future expectations are for imports to continue serving as a substitute for declining domestic supplies. Figure 3, which shows total PADD III imports and domestic receipts which includes internal production, is representative of how Texas City's petroleum disposition has evolved.

For instance between 1995 and 2004, the combined growth rate for the sum of PADDIII foreign imports, domestic

FIGURE 3
PADD 3 (U.S. Gulf Coast) Foreign Crude Oil Imports and
PADD 3 Domestic Production Plus Receipts by Pipeline, Tanker, and Barge
1986-2004



Source: Aggregated from U.S. Department of Energy, Energy Information Administration data.

production and internal receipts, and includes domestic receipts, grew at an average annual rate of 1.1 percent. The 1995-2004 average annual growth of 1.1 percent consists of decreases in domestic receipts and PADD3 production and of increases in foreign imports.

As the EIA notes while financial and legal considerations make construction of new refineries difficult, existing refinery additions are expected in order to accommodate the net effect of higher throughputs[10]. The effect of efficiencies through bottle-necking, refinery expansion and substitution of imports for declining domestic production provides for additional capacity. Overall EIA (January 2007) is forecasting domestic distillation capacity to increase by over 17 percent between 2005 and 2030. In comparison to the 1981 peak of 18.6 million barrels per day, distillation capacity is projected to grow from the 2005 year-end level of 17.1 million barrels per day to 20 million barrels per day in 2030 in the reference case and 22.3 in the EIA high economic growth forecast. Almost all new capacity additions are projected to occur on the Gulf

[10] Energy Information Administration, Annual Energy Outlook 2005, "Market Trends – Natural Gas Demand and Supply", p. 7.

Coast. According to the EIA (AEO2006 and 2007), U.S. existing refineries will be utilized intensively (92 to 95 percent of operable capacity) throughout the EIA forecast period. The 2005 U.S. refinery utilization rate was approximately 91 percent, well above the lows of 69 percent during the 1980s and even the 88 percent mark during the early 1990s but down about 4 percent since the late nineties and early 2000s. The decrease in U.S. refinery utilization also reflects capacity expansions completed in recent years. EIA also emphasizes that distillation capacity increases are expected due to improved processing of the intermediate streams obtained from crude distillation and subsequent reductions in residual fuel. Texas City industry personnel confirmed improved processing realizations. The EIA expectation is that the market for residual is shrinking, and the improved distillation processing will produce higher value "light products" such as gasoline, distillate, jet fuel, and liquefied petroleum gas. Texas City records for recent years show residual fuel movements relatively low in comparison to distillate, with much of the distillate increase due to temporary gaps in heavy crude availability. Texas City distillate imports, as well as exports and coastwise shipments, have exhibited significant growth over the last decade. Foreign exports of distillate increased from 50,000 short tons in 1995 to an average of 731,000 for 2003-2005. Distillate imports grew from 235,000 short tons in 1995 to an average of 1.7 million for 2003-2005 (Table 5). Deep-draft coastwise distillate shipments increased some as well, from 135,000 short tons in 1995 to 712,000 short tons for 2003-2005 (Table 7).

In general, the EIA expects that world demand for "light products" will be supplemented by foreign markets, particularly in the Asia/Pacific region. Refinery construction in developing countries is noted to generally necessitate configurations that are more advanced than those currently in operation in the U.S. The EIA notes that foreign refineries will generally need to supply lighter products from crude oils whose quality is anticipated to deteriorate between 2003 and 2030. The trends are generally more reflective of the U.S. regions other than the Gulf as the Texas City refineries have the capability to refine several grades of crude petroleum and this capability has resulted in a large market share.

While recognizing refined product import trends which are due in part to refinery capacity limitations in regions largely outside the U.S. Gulf Coast, both EIA (2007) and Global Insight (2007) show imports increasing over the forecast periods. Additionally, exports of refined products are projected to increase but at a more modest rate. Both the EIA and Global Insight provide forecasts of product imports, product forecasts indicators are more general. The EIA in their AEO2007 publication is forecasting an average annual growth of 0.9 percent for 2005-2030 U.S. product exports. Examination of Texas City's long-term product exports 1990-2005 trend line shows general upward movement with average annual growth of 9.1 percent. Product exports grew from about 1,166 thousand in 1990 to 4.3 million in 2005, with 2005 volumes representing a record high. Product export consists primarily of petroleum coke. For the period

1990-2005, U.S. total product exports increased from 46 million to 63 million, with coke exports increasing from 16 million to approximately 30 million. Global Insight is forecasting average annual growth rates of about 4 percent in income related to exports of industrial materials, which includes petroleum products.

In addition to potential uncertainty due to refinery capacity limitations, the effect of price increases was investigated. An outcome of high oil prices and world stability concerns experienced since 2005 demonstrates obvious uncertainty inherent in forecasting crude oil market trends. Crude oil prices in the AEO2007 reference forecast are substantially higher than the AEO2005 forecast but are lower than other projections. Table 12 displays comparison of the AEO2007, Global Insight, Inc., and Deutsche Bank petroleum import forecasts. The AEO2007 release shows average annual growth rates of -0.04 percent for 2005-2015 and 1.8 percent for 2015-2030. Global Insight shows annual growth of 0.9 percent from 2005-2015 and 1.4 percent from 2015-2030; and Deutsche shows 1.9 for 2005-2015 and 2.1 percent for 2015-2030. Global Insight and Deutsche provide a combined forecast of crude oil and products, the higher rates of growth likely associated with products. Analysis of Texas City's historical trend and discussions with industry demonstrate that Texas City is more likely to experience growth slightly above the national rates and, therefore, is more likely to reflect the EIA or Global Insight in the short run. Additionally, the forecast comparison is for the U.S. total which reflects relatively high volumes of refined products than Texas City. Texas City's present and future distribution will continue to reflect imports of the base materials due to its role as a refiner and distributor.

Uncertainty also relates to oil depletion and growth of alternative fuels. The EIA notes in its "Issues in Focus" discussion (January 2005), that while fossil fuels are, no doubt, subject to depletion, increased scarcity and subsequent higher prices, there are many resources that are not heavily exploited. Higher prices, and the inference of profit increases, can be expected to lead to the development of sites and technologies, including production from oil sands, ultra-heavy oils, gas-to-liquids technologies (GTL), coal-to-liquids technologies (CTL), bio-fuel ultra-heavy oils, and shale oil. Non-conventional liquid production is noted as a potential buffer against high oil prices.

TABLE 12
Comparison of Annual Energy Outlook (AEO) and Alternative Forecasts
U.S. Crude Oil Imports 2005 and 2015-2030 and
World Oil Price

Year	AEO 2006	AEO 2007	Global Insights a/	Deutsche Bank a/
Crude Petroleum and Products (Millions of Barrels Per Day)				
2004-05	12.57	12.57	12.57	12.57
2015	13.33	12.52	13.75	15.37
2025	15.60	14.87	17.03	19.31
2030	17.09	16.37	17.03	21.13
Average Annual Growth Rates				
2004/05-2015	0.6%	-0.04%	0.9%	1.9%
2015-30	1.7%	1.8%	1.4%	2.1%
Crude Oil Prices/Barrels (2005 $)				
Year	AEO 2006	AEO 2007	Global Insights	Deutsche Bank
2005	$55.76	$56.76	$56.76	$51.63
2015	$48.50	$49.87	$46.54	$40.11
2030	$57.82	$59.12	$40.25	$40.16

Source: U.S. Department of Energy, Energy Information Administration, 2007 Annual Energy Outlook, February 2007.
a/ As presented in the 2007 Annual Energy Outlook.

In the 2007 State of the Union Address, President Bush set the goal of cutting U.S. consumption of gasoline by 20 percent in the next 10 years. In order to meet this goal, the President proposed reforming fuel economy standards to make cars more energy efficient. On the supply side, the President has proposed increasing the supply of alternative fuels by setting a mandatory fuels standard to require 35 billion gallons of renewable and other alternative fuels in 2017. The goals outlined in the State of the Union address were reviewed in relationship to the EIA forecasts, and it was found that Texas City's petroleum import forecast fully recognizes the effect of alternative fuel utilization because as it is based on direct application of the AEO projections. The use of alternative fuels, such as ethanol, biodiesel, and CTL, is projected to increase substantially in the reference case as a result of the higher prices projected for traditional fuels and the support for alternative fuels provided in recently enacted Federal legislation. Table 13 summarizes the

AEO2007 U.S. energy production, consumption and import projections. The expectation is that Texas City's focus will be continue as a petroleum refinery center for the AEO forecast period and have a relatively smaller role than other U.S. regions in alternative fuels.

It is also important to note that the future of unconventional oil and liquids production, such as oil shale, CTL, and GTL, will depend on oil prices. For example, CTL production is projected in both the reference and high price cases; GTL and oil shale production are projected only in the high price case; and no unconventional oil production of any kind is projected in the low price case. The reference case forecast was used for Texas City's projections. The EIA's January 2007 crude oil import projections show non-conventional liquids production, which includes renewable resources such as ethanol increasing from 3.7 quadrillion BTUs in 2005 to 6.3 quadrillion BTUs per day by 2030. In the transportation sector, ethanol is the most widely used liquid biofuel in the world. Ethanol use grows in the AEO2007 reference case from 4 billion gallons in 2005 to 14.6 billion gallons in 2030.

Additionally, higher prices are noted being a function of inadequate refinery capacity. In turn, current capacity inadequacies are likely tied to years of low oil prices and producers' fear of surpluses. Recent price increases and expectations of a long-term price plateaus have boosted interest in investment; however, continuous price increases could lead to long-term declines in demand and, henceforth, deter investment interest.

Texas City Commodity Projections Overview

Table 14 displays the commodity projections used for Texas City's base line benefit calculations. The AEO2006 reference forecast was used for Texas City's crude petroleum and petroleum product import and exports. The crude petroleum forecast presented in Table 14 incorporates the AEO2006 2003-30 projections into a regression equation estimated using Texas City and U.S. 1975-03 imports. The effect of using the more recent AEO2007 forecast and the inclusion of 2004-2005 Texas City tonnage was evaluated as a sensitivity analysis. The results of that sensitivity analysis showed that the crude petroleum projections were within 0.2 percent of the 2010-2030 forecast values shown in Table 14. Additional results from that analysis are contained in the sensitivity section of this appendix.

TABLE 13
Comparison of Annual Energy Outlook 2007 Alternative Forecasts U.S. Crude Oil Imports 2005 and 2015-2030 and U.S. Production, Imports, and Consumption (quadrillion BTU)

	2004	2005	2015	2020	2030
Production					
Crude Oil and Lease Condensate	11.58	10.96	12.52	12.48	11.40
Natural Gas Plant Liquids	2.46	2.33	2.45	2.38	2.31
Dry Natural Gas	19.32	18.77	20.19	21.41	21.15
Coal	22.85	23.20	25.74	26.61	33.52
Nuclear Power	8.22	8.13	8.47	9.23	9.33
Hydropower	2.71	2.71	3.07	3.08	3.09
Alternative Fuels	**3.85**	**3.69**	**6.69**	**6.90**	**7.82**
Biomass a/	2.81	2.71	4.45	4.69	5.26
Other Renewable Energy b/	0.74	0.76	1.26	1.33	1.44
Other c/	0.29	0.22	0.98	0.89	1.12
Total Production	70.98	69.80	79.12	82.09	88.63
Imports					
Crude Oil d/	22.02	22.09	22.96	24.72	28.63
Liquid Fuels and Other Petroleum	6.11	7.16	6.56	7.05	9.02
Natural Gas	4.36	4.42	6.43	6.17	6.47
Other Imports e/	0.82	0.85	1.02	1.73	2.26
Total Imports	33.30	34.52	36.97	39.66	46.37
Consumption					
Liquid Fuels and Other Petroleum	40.79	40.61	44.26	46.52	52.17
Natural Gas	23.05	22.63	26.07	27.04	26.89
Coal	22.60	22.87	25.64	27.29	34.14
Nuclear Power	8.22	8.13	8.47	9.23	9.33
Hydropower	2.71	2.71	3.07	3.08	3.09
Alternative Fuels	**3.31**	**3.23**	**4.76**	**5.00**	**5.54**
Biomass f/	2.53	2.38	3.48	3.64	4.06
Other Renewable Energy c/	0.74	0.76	1.26	1.33	1.44
Other	0.04	0.08	0.03	0.04	0.04
Total Consumption	100.67	100.19	112.28	118.16	131.16

a/ Includes grid-connected electricity from wood and wood waste, biomass such as corn used for liquid fuels production, and non-electric energy from wood.

b/ Includes grid-connected electricity from landfill gas; municipal solid waste; wind; photovoltaic and solar thermal sources; and non-electric energy from renewable sources, such as active and passive solar systems. Excludes electricity imports using renewable energy.

c/ Includes liquid hydrogen, methanol, and some domestic inputs to refineries.

d/ Includes imports of crude oil for the Strategic Petroleum Reserve.

e/ Includes coal, coal coke (net), and electricity (net).

f/ Includes grid-connected electricity from wood and wood waste, biomass such as corn used for liquid fuels production, and non-electric energy from wood.

Source: EIA, extracted from energy supply and disposition overview, 2007 Annual Energy Outlook, January 2007.

TABLE 14

Texas City Projections for Commodity Groups Used for Benefit Calculations

Totals by Commodity Group

(1,000's of short tons)

	Crude Petroleum	Petroleum Products		
Year	**Imports**	**Imports**	**Exports a/**	**Coastwise Shipments**
1999	26,900	791	692	3,687
2000	34,646	1,519	842	5,058
2001	38,688	1,382	1,056	4,590
2002	32,864	2,326	720	3,092
2003	38,773	1,254	910	3,963
2001-03	36,775	1,654	895	3,882
2010	43,680	2,186	966	4,304
2020	53,246	2,842	1,015	4,898
2030	64,351	3,379	1,055	5,573
2040	71,084	4,016	1,096	6,341
2050	78,520	4,775	1,138	7,215
2060	86,735	5,677	1,183	8,210
Average Annual Tonnage Growth Rate (2001/03 to 2030)				
	2.0%	2.7%	0.6%	1.3%
Average Annual Tonnage Growth Rate (2030-60)				
	1.0%	1.7%	0.4%	1.3%
Average Annual Tonnage Growth Rate (2001/03-60)				
	1.1%	2.1%	0.5%	1.3%
Short Tons of Cargo Used for Benefit Calculations				
	Crude Petroleum	**Petroleum Products**		
Year	**Imports**	**Imports**	**Exports a/**	**Coastwise Shipments**
2010	34,944	895	145	430
2020	42,597	1,164	152	980
2030	51,481	1,383	158	1,115
2040	56,867	1,644	164	1,268
2050	62,816	1,955	171	1,443
2060	69,388	2,324	177	1,642

a/ Excludes petroleum coke. Petroleum coke is exported from an area not in the 45-foot reach.

Source: U.S. Department of Energy, Energy Information Administration, 2006 Annual Energy Outlook

Texas City's long-term growth expectations, in particular post-2030, are assumed to be more reflective of the EIA and Global Insight projected trend lines. Texas City's product forecasts are based on direct application of the AEO2006 growth rates using Texas City's 2001-2003 average product volumes as a base. The growth rate for Texas City product exports for 2001/03 to 2030 shown in Table 14 is 0.6 percent per annum. The AEO2006 U.S. product export growth rate was 0.4 percent per annum and the AEO2007 U.S. product export growth rate is 0.9 percent.

The growth rate for Texas City product imports for 2001/03 to 2030 shown in Table 14 is 2.7 percent per annum. The AEO2006 U.S. product import growth rate for comparable product groups was 2 percent per annum. The AEO2007 U.S. product export growth rate is also about 2 percent. The domestic coastwise petroleum product shipment forecast was prepared based on extrapolation of Texas City's recent historical trends with an average annual growth rate of 1.3 percent anticipated for 2010-2060. Published forecasts of coastwise shipments are not available but general indicators, such as the Corps Inland Waterway Review forecasts, show waterborne petroleum product traffic growing at 1.7 percent per year. Use of an annual growth rate of 1.3 percent for coastwise shipments was viewed as being reasonable.

Crude Petroleum Imports Forecast Methodology

Determination of the general forecast methodology and regression equation used for the crude oil forecast was based on the relative magnitude of the R squared values, the significance of the t-value and F statistic, and the smallest standard error of the Y coefficient. Table 15 displays the regression equation output that reasonably validates the applicability of national forecast indicators.

TABLE 15
Regression Equation Output for
Texas City Crude Oil Imports a/

Component	Description of Data and Outputs
Dependent Variable	TC Crude Imports (1975-03)
Independent Variables	U.S. Crude Imports and Year
Constant	-1,540,258
Std Err of Y Estimate	3,029.90
Adjusted R Square	0.8992
No. of Observations	29
Degrees of Freedom	2
X Coefficient: U.S. Crude Oil Imports	0.0040
X Coefficient Level of Significance of t value	0.99999
X Coefficient: Year	780.68
X Coefficient Level of Significance of t value	0.9961
F Statistic	125.93
Significance of F statistic	0.99999

a/ Texas City 2010 Imports = -1,540,258 + (780.68* 2010) + (.004 * 3,677,426); with 3,677,426 being U.S. imports in 2010.

Other variables, principally lower 48 state production, were also examined; however, U.S. import levels generated relatively stronger statistic indicators. For comparison, Global Insight's (September 2005) forecast previously displayed in Table 12 was used. Table 16 presents the Texas City application for the EIA and Global Insight 2001-2030 forecasts. The EIA reference forecast was used to calculate the baseline benefit calculations and the EIA import volumes were used. Global Insight's September 2005 forecast was evaluated as one of several sensitivities. Global Insight more recent forecasts, such as their First Quarter 2007, are for combined U.S. crude petroleum and products. While Texas City and U.S. crude petroleum is well correlated, Texas City's product volumes are not correlated with the U.S. Texas City imports are primarily characterized by raw materials and partially refined products. The national market consists of a greater range of fully refined products, largely gasoline. Texas City's imports of gasoline are relatively low and the port's gasoline movements primarily consist of outbound coastwise shipments to the U.S. East Coast. For this reason, the more recent Global Insight forecast was not used for current sensitivity studies.

TABLE 16
Texas City Crude Petroleum Imports (1000's of short tons)
Application of U.S. Department of Energy 2001-2025 and
Global Insight 2001-2030 Forecasts

Year	Base Application Estimated Value	Application of One Standard Error			Average Annual Growth Rate
Texas City Imports with U.S. Department of Energy Application (2003-30)					
2001-03	37,121 a/	34,091	To	40,151	
2010	43,680	40,115	To	47,245	2.1%
2020	53,246	48,900	To	57,592	2.0%
2025	58,718	53,925	To	63,510	2.0%
2030	64,351	59,098	To	69,603	1.8%
Texas City Imports Global Insight Application (2003-30)					
2001-03	37,121 a/	34,091	To	40,151	
2010	44,599	40,959	To	48,239	2.3%
2020	54,097	49,682	To	58,513	1.9%
2025	59,014	54,197	To	63,831	1.8%
2030	63,594	58,404	To	68,785	1.5%

a/ The 2001-2003 value of 37,121 thousand short tons was estimated using the regression equation. Actual 2001-2003 average was 36,775 thousand. The more recent 2003-2005 average is 39,087 thousand.

Source: U.S. Department of Energy, Energy Information Administration, December 2005, and Global Insight, Petroleum Supply/Demand Balance, Table 13, September 2005.

Crude Petroleum Fleet

Vessels in the 80,000 to 119,999 DWT range transported 95 percent of Texas City 2000-03 crude petroleum imports with the highest concentration of new tanker construction in the 100,000 to 119,999 DWT and 151,000 to 171,000 DWT ranges (Lloyd's Register CD-ROM, July 2005). The design drafts for 99 percent of 80,000 to 119,999 DWT vessels using Texas City exceed 40 feet (Table 17).

TABLE 17
Texas City Crude Petroleum Imports, 2000-2003
Median Vessel DWT and Design Draft

DWT Range	Vessel DWT	Design Draft (ft)	Year Built	% of Cargo Tonnage
Less than 47,999	19,225	33	1992	0.2%
47,999 to 59,999	54,857	41	1981	0.7%
60,000 to 69999	62,401	42	1983	3.8%
70,000 to 79,999	72,076	44	1997	0.6%
80,000 to 89,999	86,539	41	1986	22.6%
90,000 to 99,999	96,490	44	1992	34.8%
100,000 to 119,999	107,147	49	1998	32.8%
126,000 to 138,999	135,942	55	1993	0.1%
139,000 to 151,000	147,211	54	1993	2.5%
151,000 to 171,000	159,288	56	1997	2.0%
				100.0%

Source: Compiled from U.S. Army Corps of Engineers, Navigation Data Center detailed records, 2000-03.

Specific vessel design drafts and trade route limitations were of particular interest in identifying expectations concerning the percentage of tonnage anticipated to load to depths over 40 feet. Analyses revealed that nearly 75 percent of crude oil Texas City tonnage is shipped in vessels with loaded drafts greater than 36 feet. The 2001-2003 distribution of Texas City imports by vessel size and trade route is displayed in Table 18. Data for 2004-2005 is not shown in Table 18 but it was reviewed and found to be consistent with that for 2001-2003. The sizes of vessels used for specific trade routes remains fairly constant as vessel size selection is made based on cost efficiencies given Texas City's existing channel depth and the depths at trading ports. An additional consideration is trade route constraints, such as the present Panama Canal limitation restricting vessel beam widths to 106 feet.

TABLE 18
Texas City Crude Petroleum Imports, 2001-03 By Trade Route and Vessel DWT

Trade Route or Region of Origin	Vessel DWT Range (1000's) 47.9 to 59.9	60 To 69.9	70 to 79.9	80 to 89.9	90 To 99.9	100 to 119.9 a/	139.9 to 150 a/	>150	Total	Average 2001-2003 Tonnage 1000's
Canada	0%	0%	0%	0%	22%	48%	0%	30%	100%	349
Mexico	0%	0%	0%	29%	32%	39%	0%	0%	100%	3,396
Venezuela	1%	0%	0%	4%	15%	81%	0%	0%	100%	6,587
Guatemala	13%	78%	2%	0%	6%	0%	0%	0%	100%	1,327
Central & S America	1%	17%	5%	7%	24%	41%	4%	0%	100%	3,725
Western S America	0%	100%	0%	0%	0%	0%	0%	0%	100%	57
Western Africa	0%	0%	0%	0%	13%	43%	44%	0%	100%	1,156
Mediterranean & Europe	0%	0%	0%	8%	6%	23%	24%	38%	100%	1,750
Far East	0%	0%	0%	0%	0%	100%	0%	0%	100%	159
Mid East	0%	0%	0%	8%	29%	46%	9%	7%	100%	3,772
Gulf of Mexico Lightering b/	0%	0%	0%	23%	39%	34%	1%	2%	100%	16,495
Total	1%	5%	1%	15%	28%	43%	4%	4%	100%	38,733

a/ The 120-138K range represents less than 3 percent of the world fleet and do not generally use Texas City.

b/ Includes shuttle vessels and lightened mother vessels. The origins of the tonnage included in this group are primarily Middle Eastern shuttle vessels; this category includes tonnage Africa, Mediterranean, and Europe lightened mother vessels as well as shuttles.

Source: Compiled from U.S. Army Corps of Engineers, Navigation Data Center detailed records.

Texas City's fleet records showed that the primary vessel size for the Mexico, Venezuela, and Eastern South America routes is 100,000 to 119,999 DWT, and examination of the per ton transportation cost for shipments from Mexico and South America to Texas City revealed that 100,000 to 119,000 DWT is a cost effective choice given channel depths between 40 and 48 feet. At the present time, tankers in the 60,000 to 69,999 DWT range are generally used for crude shipped from Guatemala.

While selection of these smaller tankers is due to channel depth restrictions and vessel availability, the design drafts of most of these vessels fall between 41 and 44 feet. Relatively small tankers are also used for movements from Ecuador. The Ecuadorian movements are, of course, restricted by the Panama Canal which presently limits loaded drafts to 39.6 feet and beam widths to 106 feet[11]. Shipments from Ecuador and Guatemala represent less than 1 percent of Texas City's 2001-2003 import average. While the volume of tonnage shipped from Canada is low, all of the tankers used for Canadian crude shipments were in excess of 90,000 DWT. All 2001-2003 tonnages came from Eastern Canada and were, therefore, not impacted by Panama Canal restrictions. The maximum size vessels used for Nigerian crude oil are principally in the 100,000 to 165,000 DWT range. Vessels over 200,000 DWT are used for some Northern Europe transits associated with offshore lightering operations, in particular the North Sea and Norway movements. Vessels in the 200,000 to 375,000 DWT range are used for Persian Gulf crude; with most tonnage using 300,000 to 350,000 DWT vessels. The Corps' Navigation Data Center (NDC) records only include records of vessels that come into U. S ports, such as Texas City, and do not include records of vessels that offload at the lightering zone. Most crude imported from the Persian Gulf is shipped in large crude carriers that offload their entire contents on to shuttle vessels. Table 19 presents Gulf of Mexico percentage of crude petroleum imports by trade route aggregated from the U.S. Department of Energy files, and Table 20 presents Texas City's approximate distribution for the same period.

[11] Expansion of the Panama Canal which is likely within the next 15 years is anticipated to reduce beam width and draft restrictions.

TABLE 19
Petroleum Administration for Defense District III
(U.S. Gulf Coast Region)
Crude Petroleum Imports 2001-2005

Trade Route/Country	2001	2002	2003	2004	2005
Canada	0.00%	1.20%	0.50%	0.30%	0.52%
Mexico	24.1%	27.2%	27.1%	26.7%	25.0%
Venezuela	20.2%	20.5%	19.7%	20.5%	17.5%
Guatemala	0.30%	0.00%	0.40%	0.30%	0.17%
Central & South America	4.9%	4.8%	3.5%	2.9%	5.7%
Western South America	0.2%	0.1%	0.5%	1.2%	1.6%
Western Africa	10.5%	7.7%	9.6%	12.9%	11.9%
Mediterranean & Europe	4.4%	9.0%	9.0%	7.3%	13.2%
Far East	0.20%	0.20%	0.20%	0.10%	0.70%
Mid East	35.0%	29.3%	29.4%	27.8%	23.7%
Total PAD III Imports	100.0%	100.0%	100.0%	100.0%	100.0%

The format of the Corps of Engineers' Waterborne Commerce Statistics Center (WCSC) shipping records, obtained by the USACE NDC through the Bureau of Census, does not provide sufficient information to distinguish lightened tonnage from direct or lightered tonnage and, therefore, the EIA's Gulf Coast distribution was utilized to better identify relative percentages of imports by trade route. Consultation with Texas City industry representatives revealed that the Gulf Mexico destination well represents Texas City's recent historical distribution; therefore, the EIA Gulf Coast country of origin distribution was applied to the Texas City's 2001-03 base tonnage used for the 2010-60 tonnage projections. The NDC data is problematic in accurately identifying specific country of origin for lightered movements. The NDC data becomes useful in identifying the total volume of tonnage transferred offshore; however, it again becomes problematic in discerning direct shipments from vessels lightened offshore. Texas City's NDC data (Table 18) show that 43 percent or an average of 16,495 thousand tons of 2000-03 import tonnage was transported through the Gulf of Mexico lightering zone. It is likely that this total primarily comprises shuttle vessels associated with Mid East imports; however, it also includes lightening mother vessels from various regions, principally Nigeria and other African locations.

TABLE 20
Texas City Channel
(1000's of short tons)
Estimated Distribution of Imports by Trade Route 2000-2005

Region or Country	2000	2001	2002	2003	2004	2005
Mexico	3,993	4,044	4,281	3,209	7,117	7,190
Guatemala	1,049	1,040	1,177	1,254	971	603
Venezuela	2,695	3,487	5,305	6,224	7,440	6,847
Colombia	1,194	1,171	737	21	349	411
Trinidad	2,990	2,597	3,409	3,320	2,285	1,701
Transshipped by Caribbean	2,262	4,095	248	245	244	155
Western South America	0	60	0	59	222	179
Canada	0	0	82	361	0	315
Panama	0	0	0	0	0	726
Middle East, Western Africa, Europe and Mediterranean,						
and Far East a/	20,464	22,165	17,644	23,263	23,463	17,518
Total Tonnage	34,646	38,638	32,897	37,457	41,512	35,644
			% by Region			
Mexico	11.5%	10.5%	13.0%	8.8%	17.8%	12.3%
Venezuela & Guatemala	10.8%	11.7%	19.7%	20.4%	21.0%	16.7%
Colombia	3.4%	3.0%	2.2%	0.1%	0.9%	1.9%
Trinidad	8.6%	6.7%	10.4%	9.1%	5.7%	8.1%
Transshipped Caribbean	6.5%	10.6%	0.8%	0.7%	0.6%	3.8%
Canada & W South America	0.0%	0.2%	0.3%	1.1%	0.5%	0.4%
Panama						
Far East						
Middle East, Western Africa, Europe						
& Mediterranean a/	59.1%	57.4%	53.6%	60.0%	53.5%	56.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Compiled from U.S. Department of Energy, Energy Information Administration website and USACE, Navigation Data Center detailed files.

a/ Includes tonnage transferred at the offshore lightering zone. Determination of the specific region of origin cannot be discerned; however, data inferences and company estimates suggest that 60 percent is from the Middle East and the remainder is from the other regions. While the other regions are diverse, the round trip mileages to Texas City from these regions are relatively similar.

Crude Petroleum Trade Routes and Methods of Shipment

Evaluation of the percentage of tonnage transported in vessels anticipated to utilize depths over 40 feet was primarily based on the relative change in per ton transportation cost between the existing 40-foot channel depth and increased channel depths. Cost analysis suggested that nearly all crude petroleum from Mexico, Venezuela, and Trinidad would utilize 45 feet. Expectations concerning the percentage of Middle East and Africa movements are subject to greater uncertainty. Nearly all Middle East tonnage is lightered. Lightering is also the least cost alternative for Far East tonnage. Lightering is defined as the process involving ship-to-ship transfer of oil cargo, and it is extremely cost effective for long-haul bulk freight and involves the transfer of tonnage at an offshore location from a larger vessel, called a VLCC (Very Large Crude Carrier), onto one or more shuttle vessels. Gulf Coast lightering occurs in the international waters of Gulf of Mexico. With lightering, the VLCC does not enter the coastal receiving port. The methods of shipping crude oil used for Texas City and other Texas Gulf Coast ports are primarily direct shipment or lightering and lightening. Lightening is a common alternative to either direct shipment or lightering for some routings, and it describes the process where enough cargo is offloaded from a tanker to permit the light-loaded mother vessel to enter a confined channel system. Africa, Mediterranean and Europe movements are either lightened or shipped direct. The tanker sizes associated with lightening on the Texas Coast generally range from 120,000 to 175,000 DWT. Tankers larger than 175,000 DWT are normally totally lightered offshore on to shuttles. Shipments from Africa, Mediterranean and Europe are usually transported in tankers between 80,000 and 175,000 DWT, with direct shipments generally using tankers between 80,000 and 120,000 DWT.

The logistics associated with offshore transfers introduces higher degrees of uncertainty than direct shipment and, therefore, generates large cost variances. Industry indicated that lower cost differences between direct versus offshore transfer costs may increase the likelihood of direct shipment. Industry personnel indicated that the number of days to completely lighter a VLCC normally ranges from 4 to 10 and that the average number of days to completely lighter 200,000 to 300,000 DWT vessels is 5.5; however, it was noted that 2 weeks is not uncommon. Five and one-half days equate to 1.5 times the in-port unloading rate. Utilization of the upper limit of 2 weeks appears to relate to a less than optimal number of shuttles and shuttle turnaround rate.

Comparison of direct shipment costs with those for lightering or lightening for the Africa Mediterranean and Europe route revealed that while the average cost for lightering or lightening is less than the average cost for shipping direct, the percentage difference between direct shipment costs and the offshore alternatives is considerably less than for either Mexico/South America or Mid East and Far East origins. The relative closeness in the costs between shipping methods for Africa, Mediterranean and Europe tonnage and, in particular, the variance associated with the number of days necessary to complete the offshore transfer process contributes to a higher percentage of direct shipment for this route than optimal or than least cost computations would suggest. A risk of delays, in association with the closeness in costs between shipping methods, contributes to a proportion of direct shipments that is higher than what might occur if the variance associated with the cost of lightering did not overlap with the cost of shipping direct. Examination of the cost data suggests that an increase in channel dimensions would probably result in an increase in direct shipment movements for Africa, Mediterranean and Europe shipments.

Comparison of the method of shipment costs for the Eastern South America and Persian Gulf did not indicate that the proposed project design would provide an incentive to switch from one method of shipment to another given channel depth constraints between 43 and 48 feet. In general, lightening is not cost effective for tonnage on the Persian Gulf trade route because the economies of scale associated with existing practices result in a lower cost for lightering than what would be attained through lightening. The reason lightering is cheaper than lightening for Persian Gulf/Indian Subcontinent shipments is because the magnitude of the mileage component of the per ton cost is large enough to offset the relatively large fixed cost attributable to having the mother vessel remain offshore for 5.5 days. For similar reasons, the relative short distance and high fixed costs associated with either lightening or lightering, eliminates any incentive for Mexico/Eastern South America shipments to shift to lightening. Despite the clear lack of economic rationale for lightering Mexico/Eastern South America tonnage or shipping Persian Gulf/Indian Subcontinent tonnage direct, relatively inefficient shipping methods are used for some shipments on these trade routes. The decision to lighter Mexico/Eastern South America tonnage or ship Persian Gulf/Indian Subcontinent tonnage direct results from less than perfect world market conditions. For purposes of analysis, the least cost practical alternative was assumed given existing technology and anticipated future innovations. Specifically, the cost calculations were made using direct shipment for the Americas; lightering for the Mid East and Far East; and lightening for Africa, Europe and Mediterranean for the 40-foot channel with a transition to direct shipment for increased channel depth alternatives based on transportation cost efficiencies.

Regardless of trade route, the vessel sizes utilized are also related to the way crude petroleum is sold. Currently, crude petroleum is sold in parcels of 500,000 barrels. A 500,000-barrel parcel converts to approximately 75,000 short tons. The most economical size vessel for a 75,000-ton parcel is between 75,000 and 100,000 DWT. For 150,000-ton parcels, the most efficient size is between 150,000 and 175,000 DWT. Ninety-four percent of the 100,000 to 140,000 DWT vessels in the world fleet have design drafts in excess of 45 feet, and 32 percent of the vessels between 75,000 and 100,000 DWT have design drafts over 45 feet. The with-project condition was formulated assuming that the maximum ship size for both direct shipments and lightered vessels would be 175,000 DWT. Vessels over 100,000 DWT would continue to be light-loaded under the with project condition; however, there would be a reduction in the number of feet light-loaded. Gulf Coast industry personnel indicated that parcel size and associated ship size are primarily a function of the existing channel dimensions and that an increase in channel dimensions would likely result in a shift to larger parcel sizes and larger vessels.

In addition to lightering and lightening, some movements are transshipped through deepwater ports in the Caribbean such as the Netherland Antilles and the Bahamas. These movements are transported on VLCCs to the transshipped sites and shipped to ports such as Texas City in tankers in the 75,000 to 100,000 DWT range. Based on mileage and vessel efficiencies, it was found appropriate to treat tonnage transshipped through the Caribbean similarly to the direct shipments from Trinidad and South America. A deeper channel in Texas City would provide opportunity for these shuttles to be more fully loaded.

Crude Petroleum Trade Route Forecast

The trade route forecast for Texas City's crude petroleum imports is based on analysis of U.S. import and world production forecasts and recent historical Texas City and U.S. Gulf Coast routings. The U.S. and Gulf Coast 2001-2005 period base distribution and the EIA 2010-2025 trade route forecast are presented in Table 21. Comparison of the U.S. and Gulf Coast distributions with Texas City's showed that Texas City's receives a lower share of Mexican crude and a higher share of South America and Caribbean crude. Venezuela and Trinidad comprise significant share of Texas City's imports. In comparison to other regions, Texas City has the capacity to refine relatively higher shares of light crude shipped from Venezuela and Trinidad as well as the heavy crudes. It was also found that Venezuela's long-term reserves are significantly higher than Mexico's reserves suggesting higher future trade volumes. For Trinidad, the EIA forecasts indicate that reserves and future production will remain relatively flat at present rates. For purposes of analysis, the EIA U.S. trade route and world production growth rates were applied directly to Texas City's 2001-2004 period tonnage. Table 22 displays Texas City's forecasted distribution of imports by major trade route. The presented in Table 22 was applied to the crude petroleum tonnage projections shown in Table 13. Mileages were weighted based on existing and anticipated percentage of tonnage by trade region. Trade regions were grouped based on general regions and similar vessel utilization patterns and port constraints. The port depths at major ports of origin are presented in Table 23.

TABLE 21
U.S. Total and U.S. Gulf Coast
Trade Route Forecast Distributions
Crude Petroleum Imports

Trade Route	2000-2004 Period			U.S. Totals 2010-2025		
	U.S. Gulf	Texas City	U.S. Total	2010	2020	2025
		Historical Base		**Energy Information Administration Forecast**		
Mexico	25.2%	12.3%	15.6%	14.3%	13.8%	13.3%
Venezuela & Guatemala a/	21.0%	16.7%	13.4%	14.4%	13.9%	13.2%
Central & South America b/	4.4%	10.2%	5.7%	5.3%	5.8%	6.8%
Western South America	0.6%	0.3%	0.3%	4.1%	3.6%	3.1%
Mediterranean & Europe	7.3%	18.2%	7.1%	1.1%	1.2%	1.3%
Western Africa	9.3%	9.5%	13.6%	26.2%	25.8%	23.4%
Middle East	31.0%	32.0%	26.1%	15.3%	15.0%	15.2%
Far East	0.2%	0.6%	2.8%	3.3%	3.6%	3.8%
Canada	0.6%	0.2%	15.4%	16.0%	17.3%	19.9%
Total	100.0%	100.0%	100.0%	100%	100.0%	100.0%

Source: U.S. Department of Energy, Energy Information Administration, January 2006.

a/ Venezuela and Guatemala were grouped together because of vessel draft limitations at some ports Venezuela ports and all Guatemala ports. Mexico and the other Central and South America ports, primarily Colombia and Trinidad, are not affected by draft limitations.

b/ Includes Trinidad and Colombia.

TABLE 22
Texas City Tonnage Forecast Percentage Distribution
Application of U.S. Department of Energy Imports by Country to Texas City
For Major Trade Routes

Trade Route	2000-04	2010	2020	2030	2040	2050	2060
Mexico	12.1%	8.3%	9.8%	7.0%	7.0%	7.0%	7.0%
Central/South America a/	24.1%	21.6%	20.1%	20.7%	20.7%	20.7%	20.7%
Trinidad	8.9%	8.1%	7.4%	7.7%	7.7%	7.7%	7.7%
Europe & Africa	24.6%	20.1%	14.5%	14.9%	14.9%	14.9%	14.9%
Middle East	30.3%	41.9%	48.2%	49.7%	49.7%	49.7%	49.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

a/ Includes transshipments.

TABLE 23
Port Depths at Major Ports Transporting Crude Oil and Petroleum Products

Region and Port	Country	Depth (ft) Port or Region
North and South America		
High Seas, Gulf of Mexico	International Waters	76
Freeport, Grand Bahamas	Bahamas	76
All Other Brazil Ports North Of Recife	Brazil	75 at Itagui.
All Other Colombia, Caribbean	Colombia	>45 at several Eastern Ports
Georgetown	Guyana	33
Veracruz	Mexico	30.8
Altamira	Mexico	42
Coatzacoalcos a/	Mexico	42
Pajaritos a/	Mexico	42
Tuxpan	Mexico	42
Cayo Arcas a/	Mexico	72.2
Dos Bocas a/	Mexico	89.9
Orangestad	Netherland Antilles	76
San Nicolas Bay	Netherland Antilles	76
Point A Pierre	Trinidad	52
Rio Haina	Trinidad	58
La Guaira	Venezuela	19.7
Puerto Miranda	Venezuela	39.5
Amuay Bay	Venezuela	41 to 45
Puerto La Cruz	Venezuela	46 to 50
All Other Venezuela Ports	Venezuela	55 at Puerto La Cruz
Vancouver	Canada	Panama Canal Restriction
All Other Chile Ports	Chile	Panama Canal Restriction
La Libertad	Ecuador	Panama Canal Restriction
Middle East		
Ras Tanura	Saudi Arabia	61-65
All Other Saudi Arabia Ports	Saudi Arabia	61-65 at Ras Tanura
Far East		
Dalian	China	57.4, Panama Canal Restriction
All Other Republic Of China Ports	China	Panama Canal Restriction
Pulau Sambu	Indonesia	41-45
All Other Malaysia Ports	Malaysia	Panama Canal Restriction
All Other Singapore Ports	Malaysia	Panama Canal Restriction
Singapore	Singapore	66-70

Continued Next Page

TABLE 23 (continued)
Port Depths at Major Ports Transporting Crude Oil and Petroleum Products
Europe, Africa, and Mediterranean

Region and Port	Country	Depth (ft) Port or Region
Skikda	Algeria	45.9
Arzew	Algeria	76
All Other Algeria Ports	Algeria	76 at Arzew; 46 at Skikda
Alexandria	Egypt	35
Shellhaven	England	47.9
Tallinn	Estonia	54
Murmansk	Former USSR	37.4
Wilhelmshaven	Germany	66
Ashdod	Israel	42.6
Rotterdam	Netherlands	74.3
Bonny	Nigeria	74.8
Kwa Ibo Terminal	Nigeria	85.3
Lagos	Nigeria	21 to 25
Calabar	Nigeria	<40; planned improvements at Calabar
Sture	Norway	75.4
Leixoes	Portugal	44.6
Lome	Togo	45.9
Istanbul	Turkey	39.4
All Other Turkey Mediterranean Region Ports	Turkey	Generally less than 40

Source: National Imagery and Mapping Agency, 2000 World Port Index, Pub. 150; Lloyds, World Shipping Encyclopedia, April 2003; and USACE, Waterborne Commerce 1996-98 detailed records.
a/ Located in the same region as the offshore Cayo Arcas, Mexico's offshore oil terminal. Cayo Arcas can load vessel drafts of up to 76 feet.

Petroleum Product Fleet for Foreign Imports and Exports

Examination of Texas City's 2000-2005 petroleum product import tonnage shows that over half of product imports were transported in vessels with loaded drafts greater than 36 feet, and over 75 percent were transported in product carriers with design drafts over 40 feet. The import groups anticipated to take advantage of depths over 40 feet are limited to fuel oil, gas oil, and light oils. Table 24 summarizes the Texas City's 2000-2003 distribution of petroleum product imports and exports by vessel DWT range for commodity groups anticipated to benefit from the proposed channel improvements.

Review of 2000-2005 product exports shows significantly more annual variance in the percentage exports transported in vessels with design draft over 40 feet (Table 24). The percentage ranged from a low of 15 percent in 2005 to a high of nearly 40 percent in both 2000 and 2001. The lower percentage ranges are associated with years when relatively high volumes were exported to South America and the Far East. The use of the Panama Canal for all of the Far East and over half of the South America destinations will continue to limit the sizes of vessels used for that trade until the Panama Canal expansions are complete. Completion of the Panama Canal deepening and widening is expected to occur within the first 15 years of the 2010-2060 Texas City study planning period. While it is anticipated that this variance will continue, the use of draft constrained vessels for several markets served by Texas City is also anticipated to continue. While published forecasts of specific trade routes are not available, Texas City presently serves markets that can accommodate more fully loaded product carriers and it was assumed that some cargo movements would transition to more fully loaded vessels based on the economics of scale of loading to increased depths and availability of channel depths in excess of 40 feet at some trading ports. Additional data related to specific percentages of recent historical tonnage transported in draft-constrained vessels in large parcels was a major consideration in identifying potential utilization of more fully loaded vessels. Large product carriers are used for the exports of fuel oil, gasoline, and petroleum coke; however, petroleum coke is shipped from a portion of the channel which will not be deepened as part of recommendations stemming from the GRR and, therefore, were excluded from the deepening analysis.

Petroleum Product Foreign Import and Export Tonnage Forecast Methodology

Texas City's petroleum product projections were prepared based on analysis of historical trends and EIA and Global Insight's forecast indicators. The EIA forecast was used for the base. Data pertaining to U.S. and Texas City relative rates of growth are displayed in Table 25 and Figures 4 and 5. Texas City exports exhibited higher overall growth in comparison to U.S. exports which essentially remained flat, particularly in recent years. In comparison, U.S. product imports exhibited consistent upward growth since the 1990s. In both the case of imports and exports, Texas City tonnage experienced high long-term growth relative to the U.S. totals.

TABLE 24
Texas City Petroleum Product, 2000-2005
Percentage of Imports and Exports by Vessel DWT

DWT Range	Design Draft (ft)	2000	2001	2002	2003	2004	2005
		Texas City Petroleum Product Imports					
Less than 47,999	37	23.3%	20.9%	19.2%	24.2%	14.7%	27.0%
47,999 to 59,999	42	21.1%	6.5%	4.0%	0.0%	0.7%	2.0%
60,000 to 69999	44	42.8%	43.7%	33.1%	43.9%	20.3%	21.5%
70,000 to 79,999	46	0.8%	4.9%	5.4%	24.8%	22.2%	23.2%
80,000 to 89,999	42	1.4%	5.0%	7.0%	4.8%	4.6%	12.6%
90,000 to 99,999	47	3.9%	6.5%	11.0%	0.0%	15.7%	0.0%
100,000 to 119,999	49	6.7%	12.5%	20.3%	2.2%	13.6%	9.4%
120,000 to 160,000	n/a	0.0%	0.0%	0.0%	0.0%	8.3%	4.3%
Total		100.0%	100.0%	100.1%	100.0%	100.0%	100.0%
		Texas City Petroleum Product Exports a/					
Less than 47,999	38	41.1%	42.3%	80.3%	81.1%	56.3%	85.4%
47,999 to 59,999	43	28.3%	8.3%	0.0%	0.0%	0.0%	2.4%
60,000 to 69999	43	20.6%	15.3%	7.7%	10.1%	7.0%	4.3%
70,000 to 79,999	45	0.0%	0.0%	0.0%	0.0%	0.0%	7.5%
80,000 to 89,999	48	6.0%	8.6%	0.0%	0.0%	12.6%	0.2%
90,000 to 99,999	45	4.0%	7.6%	12.0%	8.7%	0.0%	0.0%
100,000 to 119,999	47	0.0%	17.9%	0.0%	0.0%	12.5%	0.0%
120,000 to 160,000	54	0.0%	0.0%	0.0%	0.0%	11.5%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Compiled from U.S. Army Corps of Engineers, Navigation Data Center detailed records.
a/ Excludes Petroleum Coke.

TABLE 25

Texas City and U.S. Petroleum Products (1000's of short tons)

Foreign Imports and Exports

	Texas City Petroleum Products		U.S. Total Petroleum Products	
Year	Imports	Exports a/	Imports	Exports a/ b/
1985	406	210	74,154	21,535
1986	99	69	91,669	22,571
1987	184	206	90,113	23,427
1988	107	159	107,294	23,240
1989	64	407	109,038	26,689
1990	480	732	109,470	30,785
1991	326	1,211	96,085	39,027
1992	448	569	92,054	37,973
1993	291	758	99,236	37,282
1994	445	274	100,861	33,305
1995	962	236	78,166	33,742
1996	500	343	98,316	33,412
1997	639	826	104,167	33,206
1998	237	513	118,666	30,442
1999	791	692	124,049	30,126
2000	1,519	842	130,032	32,125
2001	1,382	1,058	134,307	33,089
2002	2,326	720	129,970	32,201
2003	1,254	910	145,792	30,047
2004	3,174	1,603	166,250	33,106
2005	2,097	2,505	162,500	n/a
	Compound Annual Rates of Growth			
1985-99	4.9%	8.9%	3.7%	2.4%
1999-03	12.2%	7.1%	4.1%	-0.1%

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the U.S., Part 2, 1990-2003.

a/ Excludes petroleum coke.

b/ The EIA total for 2003 shows a 6 percent increase over 2002 whereas the NDC data shows a 7 percent decrease; however, the overall historic long-terms rates are comparable.

FIGURE 4

Texas City Petroleum Product Imports and Exports 1985-05

1000's of short tons

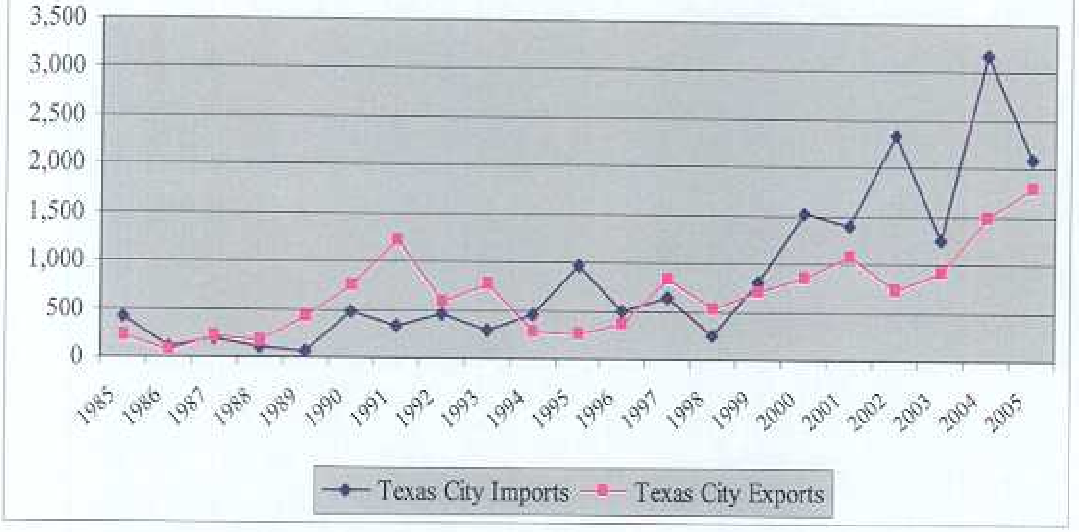
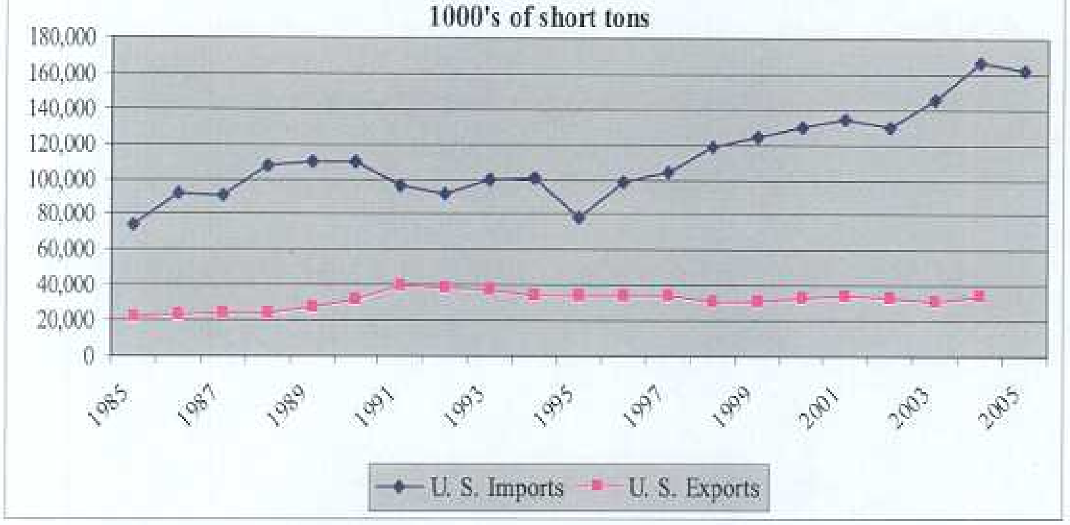


FIGURE 5

U. S. Petroleum Product Imports and Exports 1985-05

1000's of short tons



Note: Exports exclude petroleum coke.

Table 26 presents the national forecasters' crude petroleum and product export forecasts. Comparison of the forecasts helps illustrate the relative differences in growth for EIA and Global Insight's crude petroleum imports versus product imports and the anticipated substitution between the two import groups. The regional dynamics associated with the interrelationship and trade-off effects between crude and product imports indicates that the EIA forecast may be more reflective of long-term expectations for Texas City than the Global Insight forecast. Moreover, Texas City refinery gains and increased downstream capacity suggest that the EIA distribution more accurately reflects regional expectations of continued high refinery inputs for Texas City processing or throughput to Houston. As previously noted, approximately 15 percent of Texas City's crude imports are presently pipelined to Houston and additional existing throughput capacity exists.

TABLE 26
U.S. Petroleum Trade Baseline Forecasts
Comparison Energy Information Administration (EIA) and Global Insight

	EIA Forecast (1000's of barrels per day)					Average Annual Growth Rates (%)	
Commodity	2003	2004	2010	2020	2030	2003-10	2003-30
Crude Petroleum Imports	9,660	10,090	10,085	11,280	13,530	0.6%	1.3%
Refined Products Imports	1,850	2,070	2,390	3,130	3,560	3.7%	2.5%
Unfinished Oils	340	490	410	540	660	2.7%	2.5%
Blending Components	410	410	460	520	570	1.7%	1.2%
Total Product Imports	2,600	2,970	3,260	4,190	4,790	3.3%	2.3%
Product Exports a/	956	976	980	1,030	1,070	0.4%	0.4%
	Global Insight Forecast (1000's of barrels per day)						
Commodity	2003	2004	2010	2020	2030	Growth Rates (%)	
Crude Petroleum Imports	9,660	10,090	10,790	11,953	13,115	1.6%	1.1%
Refined Products Imports	1,850	2,070	3,067	5,155	7,109	7.5%	5.1%
Global Insight does not publish an export forecast for refined products							

a/ Excludes crude petroleum and natural gas.

Source: U.S. Department of Energy, Energy Information Administration, Table 117; Global Insight, Sept 2005.

The EIA U.S. product export forecast displayed in Table 26 indicates low national export growth for 2003-2010 with the average annual growth rate of 0.6 percent for U.S. product exports considerably lower than Texas City's long-term and short-term growth rates of about 8 percent (Table 25).[12] The EIA trade route forecast specific for light and heavy product imports are displayed in Tables 27-28. U.S. imports of light products, which include gasoline, gasoline blending components, and distillate fuel oil, are forecasted to increase at an annual average rate of approximately 2.9 percent for 2001/03-30. Average annual growth rates for imports of heavy petroleum products are 1.3 percent for 2001/03-30. Heavy products include residual fuel oil and unfinished oils, including lube oil. Historically, Texas City's share of heavy products exceeded that for light products, but in recent years the distribution is similar to the U.S. distribution.

The EIA's combined product growth for 2001/03-30 U.S. imports is 2.3 percent (Table 26). The 2001/03-30 rate of 2.3 percent is lower than either the U.S. historical base rate of approximately 4.0 percent (Table 25) or Global Insight's rate of 5.1 percent (Table 26). The expectation for Texas City is that product imports will continue to increase with long-term growth reflecting the EIA and Global Insight forecast ranges.

TABLE 27

U.S. Light Petroleum Product Imports by Trade Route Region a/

	Total Barrels Imports (1000's Barrels Per Day)				AAG 2001/03	Percentage by Trade Route			
Trade Route	2001-03	2010	2020	2030	to 2030	2001-03	2010	2020	2030
Northern Europe	177.7	340.0	430.0	450.0	3.4%	12%	16%	14%	14%
S Europe & Mediterranean	126.0	170.0	300.0	320.0	3.4%	9%	8%	10%	10%
West Africa	9.3	70.0	110.0	120.0	9.5%	1%	3%	4%	4%
Latin America	122.3	180.0	310.0	340.0	3.7%	8%	9%	10%	10%
Far East	128.0	180.0	270.0	290.0	3.0%	9%	9%	9%	9%
Persian Gulf	35.3	80.0	210.0	250.0	7.2%	2%	4%	7%	8%
Caribbean	265.0	380.0	530.0	540.0	2.6%	18%	18%	17%	17%
Other	180.0	210.0	300.0	310.0	2.0%	12%	10%	10%	10%
Canada	423.7	490.0	610.0	640.0	1.5%	29%	23%	20%	20%
Light Product	1,467.3	2,100.0	3,070.0	3,260.0	2.9%	100%	100%	100%	100%

a/ Includes residual fuel oil, unfinished oils, and other refined products.

Source: U.S. Department of Energy, Energy Information Administration, Table 117.

[12] Trade route details are not presented in the Global Insight data. Neither EIA nor Global Insight produce trade route details for product exports.

TABLE 28

U.S. Heavy Petroleum Product Imports by Trade Route Region a/

Trade Route	Total Barrels Imports (1000's Barrels Per Day) 2001-03	2010	2020	2030	AAG 2001/03 to 2030	Percentage by Trade Route 2001-03	2010	2020	2030
Northern Europe	162.0	160.0	140.0	200.0	0.8%	15%	14%	13%	13%
S Europe & Mediterranean	245.3	250.0	240.0	300.0	0.7%	23%	21%	21%	20%
West Africa	24.7	30.0	40.0	40.0	1.7%	2%	3%	4%	3%
Latin America	100.3	90.0	90.0	160.0	1.7%	10%	8%	8%	11%
Far East	108.7	130.0	140.0	170.0	1.6%	10%	11%	13%	11%
Persian Gulf	43.3	50.0	60.0	130.0	4.0%	4%	4%	5%	9%
Caribbean	142.7	230.0	170.0	240.0	1.9%	14%	20%	15%	16%
Other	140.7	160.0	160.0	170.0	0.7%	13%	14%	14%	11%
Canada	81.7	70.0	80.0	100.0	0.7%	8%	6%	7%	7%
Heavy Product Total	1049.3	1170.0	1120.0	1510.0	1.3%	100%	100%	100%	100%

a/ Includes residual fuel oil, unfinished oils, and other refined products.

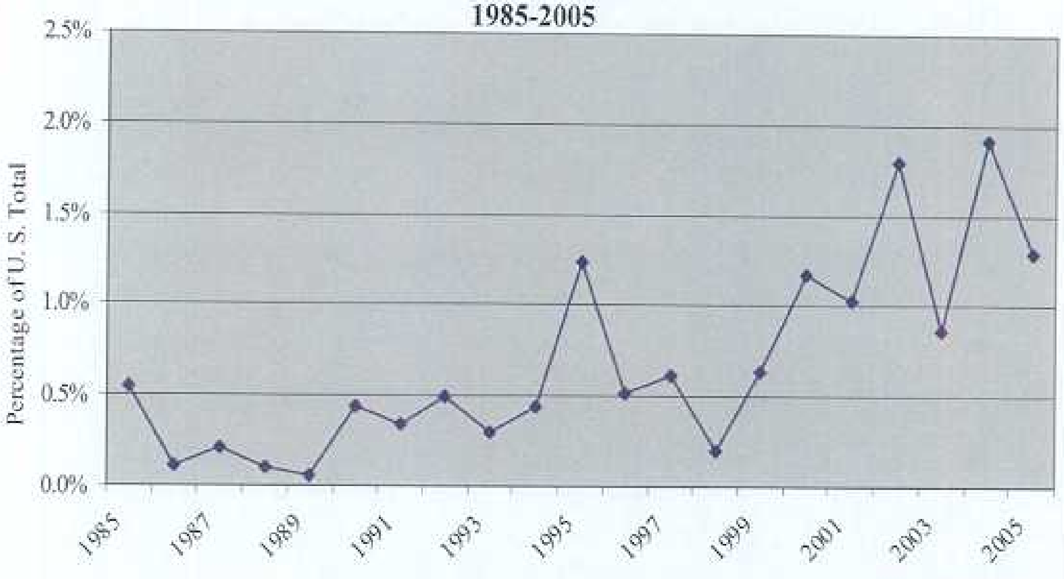
Source: U.S. Department of Energy, Energy Information Administration, Table 117.

Petroleum Product Import Forecast Application to Texas City

Forecast expectations for Texas City's product imports were based on consideration of the EIA and Global Insight forecasts and Texas City's historical trend line. Figure 6 displays Texas City's 1985-2005 percentage share of U.S. total petroleum product imports. The data revealed that, while annual variances are high, Texas City's overall share of the U.S. products increased. A noted affect of relatively high regional growth in comparison to low national growth is poor statistical correlation with U.S. product movements, and as a result, regression analysis applications are not particularly meaningful.

Review of other indicators, such as regional employment for various industrial sectors, exhibited higher degrees of applicability but overall correlation was again found to be weak. Absence of good statistical correlation between Texas City and national indicators, in combination with Texas City's relative high growth rates does suggest that, at a minimum, the national growth rates may be applicable, albeit conservative. For purposes of the GRR, Texas City's product import forecasts are based on direct application of the AEO2006 growth rates using Texas City's 2001-03 average product volumes as a base.

FIGURE 6
Texas City Refined Product Imports Percentage of U. S. Total
1985-2005



Petroleum Product Export Tonnage Forecast

Forecast expectations for Texas City's future exports was made based on consideration of the EIA forecast and Texas City's historical trend line. Examination of Texas City's historical share of U.S. product exports revealed that Texas City has experienced upward growth. Figure 7 displays Texas City's percentage share of U.S. total petroleum product exports. The display indicates that while annual variances are high, Texas City's share has, on average, increased. As with imports, Texas City's product exports grew at much higher rates than national product totals. Again, as with imports, the absence of good statistical correlation between Texas City and national indicators, in combination with Texas City's relative high growth rates generally suggests that, at a minimum, the national growth rates may be applicable, albeit conservative. EIA is forecasting a 0.4 percent 2003-30 annual growth rate. While the U.S. historic base line is much lower than Texas City's rate, for purposes of the GRR and due to the lack of alternative forecasts, Texas City's product export forecast was prepared by applying the EIA growth rates to Texas City's 2001-2003 historical base. Texas City's 1991-1993 to 2001 to 2003 average annual growth rate for product exports was 17 percent and the U.S. rate for the same period was -2 percent.

Table 29 summarizes EIA and Global Insight's forecast scenarios and their application to Texas City's import and export base. Again, the Global Insight forecast application is shown for comparative purposes.

FIGURE 7
Texas City Refined Product Exports Percentage of U.S. Total

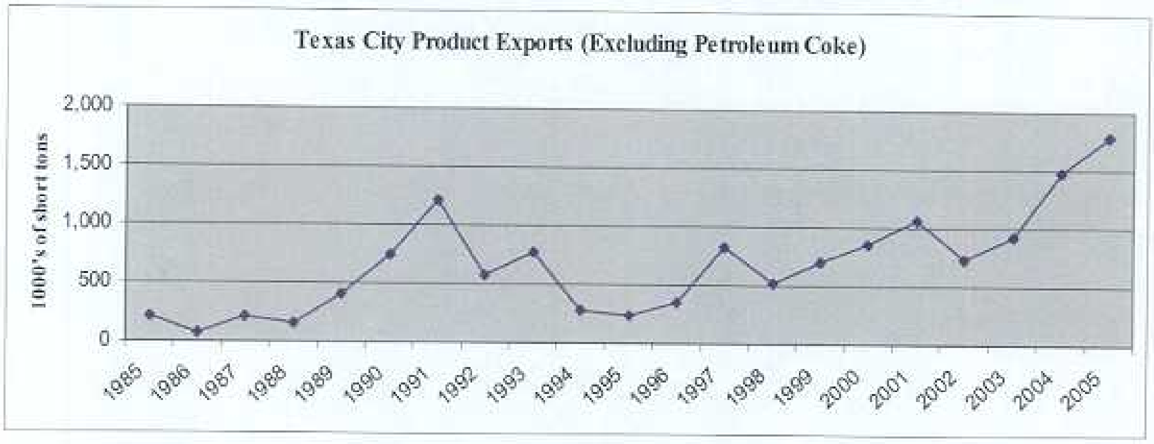


TABLE 29
Petroleum Product Import and Export Forecast
Texas City Application (short tons in 1000's)

	Texas City Imports		Texas City Exports
Year	EIA Growth Rate Application	Global Insight Growth Rate Application	EIA Growth Rate Application
2001/03	1,654	1,654	895
2010	2,186	2,742	966
2020	2,842	4,608	1,015
2030	3,239	6,356	1,055
2040	3,691	7,021	1,096
2050	4,206	7,756	1,138
2060	4,794	8,567	1,183
	Average Annual Growth Rates		
2001/03 to 2030	2.5%	5.1%	0.6%
2030-60	1.3%	1.0 %	0.4%

Percentage of Texas City Tonnage Used for Benefit Calculations
(Discussed in Following Section)

Imports	Exports
41%	15%

Source: U.S. Department of Energy, Energy Information Administration, December 2005, and Global Insight, Petroleum Supply/Demand Balance, Table 13, September 2005.

Foreign Trade Route Analysis for Product Movements

Determination of the percentage of product imports and exports likely to utilize vessels with loaded drafts over 40 feet was based on examination of the recent historical load patterns and channel depth constraints at trading ports. Table 30 displays data pertinent to Texas City's 2000-04 vessel loadings. The median design draft for Texas City parcels of 45,000 or more was approximately 45 feet for imports and 44 feet for exports.

For purposes of analysis, estimation of the future percentage of cargo anticipated to load to drafts over 40 feet was made based on historical volumes associated with parcels larger than 60,000 short tons and vessel design drafts over 40 feet, along with trade route limitations. The historical data exhibits variance and future expectations are for continued variance. In spite of uncertainties, Texas City's 2000-04 product carrier utilization record, with nearly 70 percent of imports and over 40 percent of exports moving in maximum-design draft vessels over 40 feet, and world vessel fleet trends showing increasing availability of tankers between 90,000 and 114,999 DWT suggests that some product carriers will likely utilize channel depths over 40 feet. In comparison to crude petroleum, product tonnage volumes will recognizably continue to represent a relatively small portion of total tonnage. Products represented 15 percent of 2000-03 total ocean-going petroleum tonnage and are anticipated to maintain a relatively constant share.

Much of the annual variance in product volumes stems from the time sensitive needs for raw material, particularly distillate oil. The Texas City refineries have the capability to refine both heavy and light crude. When a heavy sour production source is disrupted, refiners can run a lighter mix of crude oils. However, as in the recent Venezuelan production loss, the acquisition of additional crude oils and the shifting takes time, and runs will generally be reduced for a short time. While refineries such as Texas City, which use heavy Venezuelan crude, can use some lighter crude oils from areas like West Africa, they are designed to run most economically with the heavier crude oils. A large number of refineries in the United States can process light, sweet crude oils, while only the small fraction of refineries that have extensive desulphurization and bottoms-conversion units can use heavy, high sulfur crude oils such as that produced in Venezuela, Mexico, and Saudi Arabia, among other locations.

Analysis of EIA forecasts suggests modest long-term growth for Texas City distillate, with U.S. distillate imports increasing at a higher rate than Texas City. The future expectation that Texas City crude oil imports will be dominated by Venezuela and Mexico movements and other lower price heavy crude, when available, is indicative that Texas City's distillate imports will grow at a slower rate than for the nation, with distillate imports increasing to match shortfalls in heavy crude from Venezuela and Mexico.

TABLE 30
Texas City Channel
Petroleum Product Imports and Exports
Approximate Percentage of Tonnage Associated with Draft Constrained Vessels

% Product Import Tonnage Transported	2000	2001	2002	2003	2004	Avg.
in Vessels with Design Drafts >40 ft.	62%	73%	77%	61%	74%	69%
in Vessels with Loaded Drafts >36 ft.	56%	55%	57%	70%	67%	61%
in Vessels with Loaded Drafts >37 ft.	43%	33%	54%	58%	53%	48%
% Tonnage Associated with Larger Parcels						
parcels >=45,000 short tons	62%	63%	65%	58%	44%	59%
parcels >=50,000 short tons	59%	60%	55%	54%	40%	54%
parcels >=60,000 short tons	28%	35%	43%	10%	25%	28%
Total Imports in 1000's of short tons	1,519	1,382	2,326	1,254	3,175	1,931

% Product Export Tonnage Transported	2000	2001	2002	2003	2004	Avg.*
in Vessels with Design Drafts >40 ft.	38%	66%	23%	32%	56%	43%
in Vessels with Loaded Drafts >36 ft.	28%	n/a *	61%	34%	43%	42%
in Vessels with Loaded Drafts >37 ft.	11%	n/a *	45%	9%	39%	26%
% Tonnage Associated with Larger Parcels						
parcels >=45,000 short tons	33%	45%	28%	24%	42%	34%
parcels >=50,000 short tons	8%	45%	28%	14%	35%	26%
parcels >=60,000 short tons	0%	33%	12%	8%	28%	16%
Total Exports in 1000's of short tons (excludes petroleum coke)	842	1,058	720	910	1,417	989

* Loaded drafts for 94 percent of the 2001 petroleum products exports were not contained in the Waterborne Commerce database and are excluded from the average.

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the U. S, detailed records, 2000-04.

Distillate and gasoline are the primary commodities for product exports. Gasoline exports for the U.S. are anticipated to grow at an annual rate of less than one percent. Texas City gasoline exports are expected to grow at an annual rate of about one percent. The EIA notes that since the United States is the world's largest importer, it may seem surprising that it also exports around one million barrels a day of oil, predominantly petroleum products. Various logistical, regulatory, and quality considerations result in the export of some petroleum grades and products. For example, the Gulf Coast may export lower quality gasoline to Latin America while the East Coast imports higher quality gasoline from Europe.

Texas City's transportation benefits were evaluated for channel depth alternatives of 43 to 45 feet. The percentage of Texas City product imports used for the benefit calculations was 40 percent. The percentage of Texas City product exports used for the benefit calculations was 15 percent. These percentages were identified based on examination of parcel sizes and trade route restrictions. Analysis of foreign port depths and trade routes indicated that these percentages were reasonable.

Domestic Coastwise Petroleum Products

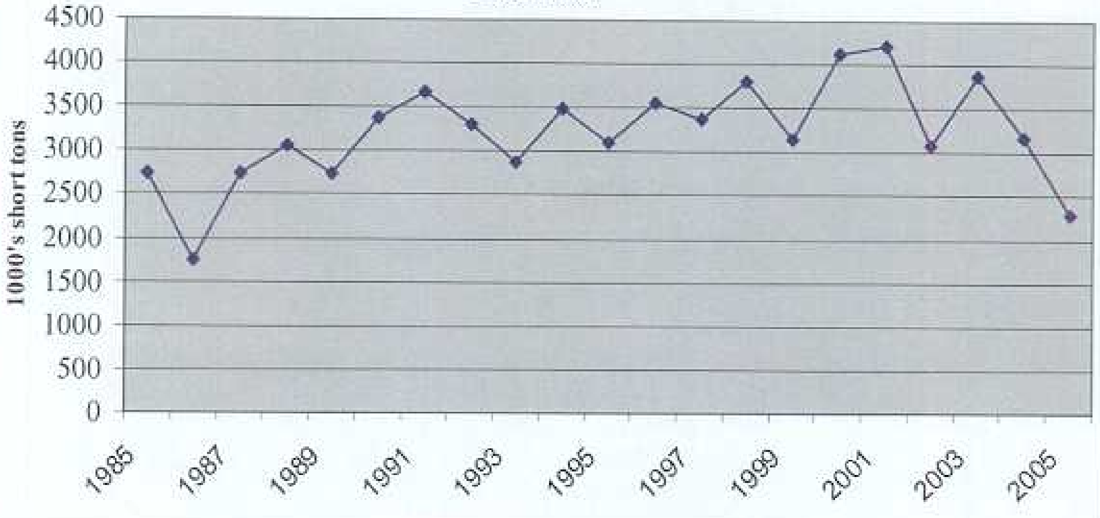
As previously noted, examination of Texas City's recent coastwise petroleum product vessels showed that approximately 10 percent of outbound coastwise shipments were transported in draft-restricted tankers. The largest product carriers generally are between the 60,000 and 80,000 DWT with design drafts in the 41 to 43-foot range. Domestic coastwise movements primarily consist of gasoline, kerosene, and jet fuel. In 2003, coastwise shipments totaled nearly 4 million. Coastwise receipts were 292 thousand short tons. Coastwise product tonnage for 1990-03 is included in the "other ocean-going tonnage" column in Table 2. Tonnage growth is primarily associated with shipments. Figure 8 displays Texas City's 1985-2003 coastwise shipment trend line. Coastwise movements primarily consist of petroleum product shipments, with about 33 percent of 2005 tonnage transported in vessels with design drafts just over 40 feet, and over 20 percent of 2003-2005 tonnage shipped in vessels with loaded drafts over 36 feet.

Examination of vessel characteristics and geographic routings suggested that some coastwise shipment tonnage would benefit from channel depths over 40 feet. The draft-restricted product carriers are generally between the 60,000 and 70,000 DWT with design drafts in the 41 to 43-foot range. While review of the 2000-2005 data presented in Table 31 shows that an average of one third of petroleum product shipments was shipped in vessels with design drafts over 40 feet, the combination of U.S. tanker availability, depths at trading ports, parcel size demand, the cost effectiveness of loading to greater drafts, and industry discussion suggest that the percentage of tonnage which would utilize channel depths over 40 feet would be closer to 10 percent in the short term increasing to 20 percent over the period of analysis.

Detailed examination of Texas City's 2001-03 shipments showed that 35.9 percent of recent coastwise products were transported in vessels with loaded drafts over 36 feet (Table 31). Coastwise receipts are not limited by the existing channel depth. As noted, the design draft of 10 percent of the coastwise shipment tankers exceeds 40 feet.

The vessels used are all U.S. flag vessels, Jones' Act vessels. The median age of the current fleet exceeds 10 years, with most vessels built in the 1980s. It is expected that

FIGURE 8
Texas City Coastwise Petroleum Product Shipments
Gasoline, Distillate Fuel Oil, and Residual Fuel Oil
1985-2005



the eventual replacement fleet will generate a higher concentration of slightly larger vessels. Additionally, it is expected that the design drafts for new vessel orders will be in the 40- to 43-foot range. Review of "vessels on order records" for U.S. tankers showed several new orders for vessels in the 60,000 to 80,000 DWT range. The majority of the current draft-constrained tankers were outbound movements of gasoline from Texas City to Port Everglades, Florida. Port Everglades has a channel depth of 42 feet and more fully loaded vessels could be accommodated. In addition to Port Everglades, there are several other U.S. East Coast ports at depths between 42 and 45 feet, with New York Harbor presently authorized to 50 feet. General indicators associated with U.S. port depth trends and eventual vessel replacement expectations suggest that 10 percent of Texas City coastwise tonnage would utilize loaded depths of 42 feet by the year 2010 given channel depth availability in Texas City. It is not unreasonable to assume that the expected 10 percent estimate would increase to 20 percent by year 2020. For the purposes of this report, 10 percent of 2010 and 20 percent of 2020-2060 coastwise tonnage were used for the channel deepening calculations. Due to continuing uncertainty about Jones Act restrictions, a sensitivity analysis using foreign-flag vessels was also prepared. The purpose of the sensitivity analysis was to better determine effects on plan optimization with a particular emphasis on the effects of a lower benefit base.

TABLE 31

Texas City Coastwise Petroleum Product Shipments

Tonnage by Loaded Vessel Draft

2001-2005

Loaded Draft (ft)	2001	2002	2003	2004	2005	Average
<=30	1,335,299	858,798	577,757	939,277	1,569,758	1,056,178
31-36	1,386,724	1,549,885	1,603,396	1,546,807	925,930	1,402,548
>=37	1,868,113	683,207	1,781,642	1,068,299	658,556	1,211,963
Total	4,590,136	3,091,890	3,962,795	3,554,383	3,154,244	3,670,690
<=30	29.1%	27.8%	14.6%	26.4%	49.8%	29.5%
31-36	30.2%	50.1%	40.5%	43.5%	29.4%	38.7%
>=37	40.7%	22.1%	45.0%	30.1%	20.9%	31.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Tonnage Transported in Vessels With Design Drafts Over 40 feet					
Short Tons	2,212,670	1,380,059	2,244,804	1,096,265	1,030,273	1,592,814
% of Total Coastwise	37.9%	31.8%	42.5%	23.3%	30.2%	33.2%
Total Coastwise	5,839,389	4,339,398	5,276,423	4,703,000	3,409,000	4,713,442

Source: Compiled from U.S. Army Corps of Engineers, Navigation Data Center detailed records.

Reduction in Transportation Cost Benefits

Channel deepening benefits were calculated for Texas City's crude petroleum and petroleum product cargoes. The transportation savings benefits were calculated using a Federal discount rate of 4.875 percent and using Fiscal Year 2005 hourly operating costs (EGM 05-01). Per ton transportation costs for channel depth alternatives of 43, 44, 45, 48, and 50 feet were compared with the existing 40-foot channel depth costs.

As discussed, the percentage of crude petroleum and petroleum products tonnage expected to accrue benefits from deeper channel depths was identified based on an examination of vessel sizes, vessel loads, foreign port depths and constraints such as the Panama Canal. Port depth, trade route, and historical vessel utilization data were used to identify the percentage of tonnage anticipated to benefit from the Texas City proposed depth increases. Texas City will not accrue deepening benefits for movements associated with the Western South America trade route nor for direct shipments from the Far East due to the vessel beam width constraint of 106 feet and the depth constraint of 39.6 feet at the Panama Canal. Some crude oil shipped from the Far East is, however, shipped in post-Panamax vessels. These vessels arrive in the Gulf of Mexico by way of the Suez Canal or the Cape of Good Hope. Post-Panamax, Suez, and VLCC vessels used for Far East crude oil could realize cost savings from increased channel depths in Texas City and the benefit calculations reflect this inclusion; however, total Far East volumes to the U.S. Gulf Coast are presently small (Table 18) and expected to remain so.

The transportation costs and the savings associated with the proposed project depth increase were calculated using commodity specific vessel class and trade route distributions. Transportation costs were calculated based on the channel depth alternatives and variables associated with vessel design drafts, maximum feet of light-loading, underkeel clearance, mileage traveled, and the number of hours to load and unload. Maximum vessel cargo capacities for crude oil and petroleum products were estimated based on review of the range of load factors obtained from IWR Report 91-R-13, National Economic Development Procedures Manual Deep Draft Navigation, November 1991 and consultation with Texas City industry and pilots association. The IWR Report 91-R-13 cargo capacity factors published in the deep draft manual for dry bulk carriers and tankers are shown in Table 32. Consultation with industry and the pilots revealed that these estimates are reasonable.

TABLE 32

Adjustments for Estimating Actual Vessel Capacity

Short Tons of Cargo as a Percentage of Vessel DWT

Vessel DWT	% Cargo to DWT
<20,000	90%
20,000 to 70,000	92%
70,000 to 120,000	95%
>120,000	97%

Source: IWR Report 91-R-13, National Economic Development Procedures Manual, Deep-Drat Navigation, November 1991, p. 77.

Table 33 presents representative round trip mileage for the trade routes or junction points used for the transportation savings computations. Table 34 presents the Fiscal Year 2005 operating cost data obtained from EGM 05-01. Double-hull foreign flag tankers were used to calculate the transportation costs for foreign imports of crude petroleum and petroleum product imports and exports. Double-hull U.S. flag tanker costs were used for coastwise product shipments.[13] The maximum size tankers presently used for U.S. coastwise movements are in the 60,000 to 70,000 DWT range.

TABLE 33

Representative Round Trip Mileage to Texas City

Coatzacoalcos, Mexico	1,376
U.S. Gulf Coast Lightering/Lightening Zone	160
Venezuela	3,612
Panama Canal	3,120
Brazil (Maceio/Sao Paulo weighted average)	9,422
Rotterdam, Netherlands	10,040
Sture, Norway	10,528
North Africa, Algiers	10,294
West Africa (Nigeria and Angola)	12,500
Persian Gulf and Indian Subcontinent via Suez Canal	19,704
Persian Gulf and Indian Subcontinent via Cape of Good Hope	25,112
Singapore via Panama Canal	24,248
Singapore via Cape of Good Hope	26,304

[13] The Oil Pollution Act of 1990 mandated that commencing in the year 2000, all Aframax and most Suezmax tankers without double bottoms or double sides that exceed 23 years of age will be barred from U.S. trade. An exemption to OPA 90 allows single-hull vessels to use U.S. deepwater ports or lightering areas until 2015.

TABLE 34
Tanker Vessel Characteristics and Hourly Operating Cost
FY 2005 Double Hull Tankers
As Presented in EGM 05-01

Vessel DWT	Design Draft (feet)	Immersion Factor	Length (feet)	Beam (feet)	Hourly Tanker Cost Foreign-Flag At Sea	Foreign-Flag In Port	U.S. Flag At Sea	U.S. Flag In Port
20,000	29.9	78.7	497.7	79.5	$617	$475	$1,413	$1,271
25,000	32.0	90.8	531.1	85.4	$639	$490	$1,457	$1,308
35,000	35.4	112.6	585.8	95.1	$682	$520	$1,545	$1,383
50,000	39.5	141.4	649.9	106.7	$752	$570	$1,681	$1,499
60,000	41.8	158.9	685.3	113.1	$795	$600	$1,768	$1,573
70,000	43.8	175.4	716.8	118.8	$838	$630	$1,855	$1,648
80,000	45.6	220.0	745.2	124.1	$880	$660	$1,942	$1,722
90,000	47.3	233.0	771.2	128.8	$919	$687	$2,008	$1,775
120,000	51.6	247.5	838.5	141.3	$1,019	$749	$2,198	$1,928
150,000	55.2	285.4	894.8	151.8	$1,127	$820	$2,400	$2,669
175,000	57.9	315.0	935.9	159.5	$1,225	$888	$2586	$2,248
200,000	60.3	343.0	973.0	166.5	$1,318	$951	$2,766	$2,399
265,000	65.7	410.7	1,056.0	182.3	$1,555	$1,111	$3,214	$2,770
325,000	69.9	467.9	1,120.7	194.6	$1,715	$1,201	n/a	n/a

Compiled from USACE, Economic Guidance Memorandum, 05-01, October 2004.

The basic procedure used to calculate transportation costs using a 90,000-DWT foreign flag tanker as an example is illustrated in Table 35. Similar computations were made for appropriate distances and vessel sizes for each of the channel depth alternatives. The resulting costs per ton computations were calculated over the relevant range of vessels projected for each channel depth improvement, and the associated savings per ton were measured using the net differences in costs between the existing 40-foot channel and the depth alternative. The design draft for the 90,000 DWT vessels shown in Tables 34 and 35 differ. Table 34 shows a design draft of 47.3 feet and Table 35 shows a design draft of 43 feet. The later draft, which better represents Texas City's fleet, was used in Texas City's transportation cost calculations. Long-term expectations, based analyses of the world fleet suggest that design drafts in the 43- to 47-foot range should be expected over the planning period. Additionally, cost analyses indicate that the effect of a Texas City channel depth of 45 feet or more will result in a greater concentration of 90,000 DWT vessels with design drafts in excess of 43 feet. An effect of channel deepening is also likely to result in a continued and increased concentration of tankers in the 100,000 to 110,000 DWT.

TABLE 35
Transportation Cost Calculation (Mexico to Texas City)

Vessel Characteristics and Cost Inputs (Costs are Based on EGM 05-01)		
Channel Depth	40 foot	45-foot
Vessel Deadweight Tons	90,000	90,000
Design Draft (ft)	43	43
Cargo Capacity (%) a/	95%	95%
Cargo Capacity (short tons) a/	85,500	85,500
Immersion Factor (tons per inch)	233	233
Hourly Cost at Sea (from EGM)	$919	$919
Underkeel Clearance (ft) b/	3	3
Hourly Cost in Port (from EGM)	$687	$687
Round Trip Mileage from Mexico c/	1400	1400
Speed (Knots)	15	15
Total Voyage Cost (mileage/speed)*(hourly vessel cost)	$85,773	$85,773
Other Components (Loading and Unloading and Port Time)		
Maximum Load on 40 foot Channel d/	68,724	82,704
Cost Per Ton	$1.25	$1.04
Loading/Unloading Rate (short tons/hour) e/	5,250	5,250
Hours in Port	30.00	30.00
Total Loading Cost at Foreign Port	$20,610	$20,610
Total Unloading Cost in Texas City	$20,610	$20,610
Total Loading and Unloading Times	$41,220	$41,220
Total Cost Per Ton and Savings Per Ton	$1.85	$1.54
and savings Per Ton		$0.31

a/ Calculated based on data outlined in National Economic Development Handbook (IWR Report 91-R-13), p. 77, November 1991, and consultation with industry.

b/ Obtained from evaluation of shipping records and consultation with vessel pilots and terminal operators.

c/ Obtained from Lloyds/Fairplay, Distance Between Ports (CD service).

d/ Based on data outlined in National Economic Development Handbook (IWR Report 91-R-13), p. 77, November 1991. Application of the procedure shown in 91-R-13 implies that it is reasonable to use the format of the equation shown below.

Estimated short tons =~ ((DWT * Maximum % Load) - (Immersion Factor * 12 inches per ton * number of feet light-loaded).

e/ Applicable rate for Texas City terminals

f/ Port time based on unloading 5,250 short tons per hour, plus 2 hours for administrative processing.

Application Considerations
Examination of Texas City's vessel fleet, in particular the DWT and design draft relationship, revealed differences between the vessel characteristics of the Texas City tanker fleet with the characteristics shown in the EGM. The design drafts for tankers in the 70,000 to 90,000 DWT using Texas City is lower than those shown in the EGM. In addition, there were differences in vessel length and beam between Texas City's fleet and the EGM data. The effect of using Texas City's lower draft vessels reduced the magnitude of the transportation savings benefits. Table 36 displays a composite of Texas City's 2000-05 crude petroleum tanker fleet. Comparison of the EGM vessel characteristics with Texas City's fleet is presented in Table 37.

The world tanker fleet and, in particular, recent vessel buildings were examined to determine if Texas City's fleet better represent long-term expectations. For instance, the EGM shows an 80,000 DWT tankers with a design draft of 46 feet whereas for Texas City a design draft of 46 feet corresponds to a tanker over 90,000 DWT. It was found that the 80,000 DWT vessels presently using Texas City for the period 2000-2003 were older vessels and that the replacement vessels are larger. Additionally, review of the vessels-on-order and new construction showed that the median design drafts associated with the 80,000 to 84,999 DWT range is 44 feet for new vessels. The range of vessels using Texas City in 2003-2005 are more likely to the represent long-term expectations as they are more representative of new construction (Lloyds Register of Ships, August 2007) The calculations had used a design draft of 42 feet for the 80,000 DWT vessel and may, therefore, underestimate potential savings for that class. At the same time, comparison of the distribution of Texas City imports by DWT range for 2004-2005 shows a much lower rate of utilization for tankers in the 80,000 DWT range. Additionally and already noted to some extent, the effect of double-hull legislation has the effect of adding to both design draft and beam width. The effect of the legislation is helps to explain the difference between the EGM "representative vessels" and Texas City's fleet.

TABLE 36

Texas City Crude Petroleum Imports, 2000-2005

Length (LOA), Beam and Design Draft (ft), Median Dimensions

DWT Range	Vessel DWT	Design Draft (ft)	LOA (ft.)	Beam (ft.)	Year Built 2000-2005 Weighted Average	% of 2000-2003 Crude Oil Imports	% of 2004-2005 Crude Oil Imports
Less than 47,999	19,225	33	508	76	1999	0.2%	1.4%
47,999 to 59,999	54,857	41	682	106	1981	0.7%	0.1%
60,000 to 69999	62,401	42	743	106	1985	3.8%	4.4%
70,000 to 79,999	72,076	44	745	113	2000	0.6%	5.6%
80,000 to 89,999	86,539	41	800	133	1987	22.6%	2.4%
90,000 to 99,999	96,490	44	807	138	1993	34.8%	26.5%
100,000 to 119,999	107,147	49	809	138	2001	32.8%	53.4%
126,000 to 138,999	135,942	55	849	157	1997	0.1%	0.5%
139,000 to 151,000	147,211	54	899	152	1996	2.5%	3.3%
151,000 to 171,000	159,288	56	904	154	2001	2.0%	2.4%
						100.0%	100.0%

Source: Compiled from U.S. Army Corps of Engineers, Navigation Data Center detailed records.

TABLE 37
Comparison Between EGM Sample Vessel Characteristics and Vessels Used for Texas City Hourly Operating Cost Calculations

EGM Sample Vessels					Vessels Used for Texas City Calculations a/				
DWT	Design Draft (ft.)	Immersion Factor	LOA	Beam	DWT	Design Draft (ft.)	Immersion Factor	LOA	Beam
35,000	35	113	586	95	35,000	35	113	586	95
50,000	40	141	650	107	50,000	40	141	650	107
60,000	42	159	685	113	60,000	42	159	685	113
70,000	44	175	717	119	70,000	42	175	745	106
80,000	46	191	745	119	80,000	42	220	764	146
90,000	47	206	771	129	90,000	43	233	811	136
100,000	n/a	n/a	n/a	n/a	100,000	46	236	800	140
110,000	n/a	n/a	n/a	n/a	110,000	49	238	810	139
120,000	52	248	839	141	120,000	52	248	839	141
135,000	n/a	n/a	n/a	n/a	135,000	54	267	868	147
150,000	55	285	895	152	150,000	55	285	895	152
175,000	58	315	936	160	175,000	58	315	936	160

a/ Based on analysis of the world fleet and Texas City's recent historic fleet.

Comparative vessel design drafts between the Texas City and world fleet are presented in Tables 38 and 39. In order to better understand long-term effects, the vessel DWT and design draft relationship was further investigated with regard to vessel age. The results of this investigation indicated that Texas City's vessel DWT and design draft relationship better represented the characteristics of vessels likely to use Texas City during the next 10 to 15 years. The obvious effect of using relatively shallower and wider vessels are larger volumes per transit and lower per ton transportation cost within comparable draft ranges. Long-term fleet selection will continue to reflect goals of minimizing vessel operating costs.

Table 40 displays comparison of the percentage distribution of crude petroleum tonnage by trade route for the existing 40-foot project depth and the project future defined by channel deepening. The shift to larger vessels is generally anticipated to take place under both the without- and with project future conditions. Table 40 summarizes the annual transportation cost savings by channel depth.

TABLE 38
Crude Petroleum and Product Tankers
Tanker Vessels, Median Design Draft (feet)

	World Fleet (Vessels Built after 1995) Median Design Draft		Texas City Vessels Median Design Drafts for Crude & Product Tonnage	
DWT range	All Tankers	Product Tankers a/	Crude Oil Tankers	Product Tankers
8,000 to 47,998	34	37	33	35
47,999 to 59,999	38	43	41	41
60,000 to 69999	40	43	42	43
70,000 to 79,999	39	41	44	46
80,000 to 84,999	42	42	40	44
85,000 to 89,999	45	n/a	44	43
90,000 to 99,999	45	47	43	44
100,000 to 109,999	49	49	48	49
110,000 to 119,000	48	51	48	n/a
120,000 to 149,999	53	n/a	55	n/a
>=150,000	70	n/a	56	53

Source: U.S. Army Corps of Engineers, Navigation Data Center databases, 2000-03. Vessel characteristics obtained From current Fairplay/Lloyds Vessel Register CD, Summer 2005.
a/ excludes LNG and LPG and specialty tankers

TABLE 39
Texas City Crude Petroleum Imports
Average Yearly Tonnage for by DWT Range and Year Built
80,000 to 119,999 DWT Tanker Tonnage a/

		Vessel Construction Year						
DWT Range	Design Draft (ft)	1985 or earlier	1986-1989	1990-1995	1996-2000	>=2001	Total (1000's) [a/]	% by DWT
		1000's of short tons (2000-03 Yearly Average)						
80,000 to 84,999	40	42	3,351	0	0	0	3,394	12%
85,000 to 89,999	43-44	1,826	1,212	408	0	0	3,446	13%
90,000 to 94,999	43	6	321	646	0	0	973	4%
95,000 to 99,999	44-45	0	154	5,918	1,471	0	7,543	28%
100,000 to 109,999	48	0	495	1,455	7,157	1,277	10,385	38%
110,000 to 119,999	49	0	0	193	875	399	1,468	5%
Yearly Average		1,875	5,533	8,620	9,503	1,677	27,208 [a/]	100%
% by Year Built		7%	20%	32%	35%	6%	100%	

[a/] Consists only of tonnage transported in 80,000 to 119,999 DWT tankers.

Source: U.S. Army Corps of Engineers, Navigation Data Center databases, 2000-03. Vessel characteristics obtained from current Fairplay/Lloyds Vessel Register CD, Summer 2005.

Table 40
Texas City Percentage of Crude Petroleum Import Tonnage by Vessel DWT Class
Existing Conditions and 2010-2060 Future Conditions *

	Direct Shipments						Lightering	
	Mexico		South America		Europe/Africa/Med		Shuttle Vessels	
DWT	Existing	Future	Existing	Future	Existing	Future	Existing	Future
60000	5.0%	0.0%	8.0%	0.0%	0.0%	0.0%	0.8%	0.0%
80000	6.0%	5.0%	10.0%	10.0%	0.0%	0.0%	3.7%	4.5%
90000	22.0%	24.5%	12.0%	14.5%	0.0%	0.0%	27.4%	27.4%
100000	14.0%	17.4%	68.0%	70.5%	0.0%	0.0%	22.0%	22.0%
110000	47.3%	47.3%	0.0%	5.0%	0.0%	0.0%	38.6%	38.6%
120000	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
135000	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%
>=150000	5.6%	5.6%	2.0%	0.0%	100.0%	100.0%	6.7%	6.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* The existing condition distribution is based on recent historical data. The existing distribution represents cost effective vessel size choices and, therefore, is assumed to generally represent the without project future. The future condition is expected to represent the with project future. Vessel size determinations were based on an increased concentration of the most cost effective vessel sizes.

Underkeel Clearance

Underkeel clearance practices vary between companies and among ports. The analysis conducted for Texas City revealed a minimum of one foot was generally applicable; however, some companies require three feet. Actual underkeel clearance also varies annually due to the channel maintenance dredging cycle and weather conditions; however, tide is not a regular consideration for Texas City. Table 41 displays Texas City's 2001-2005 vessel movements and percentage of movements by loaded draft. The effect of the dredging cycle interval results in a greater concentration of vessels loaded to 39 to 41 feet for the period closer to the completion of maintenance dredging. For purposes of analysis three feet of underkeel clearance was used for the without- and with project conditions.

TABLE 41
Texas City Channel
Trips by Sailing Draft (2001-2005)

Loaded Draft (feet)	2001	2002	2003	2004	2005
	Ocean-Going Vessel Traffic				
	Number of Annual Vessel Movements (Inbound and Outbound Trips)				
41	1	0	0	0	4
40	61	40	27	52	193
39	179	161	214	284	125
38	132	122	101	146	93
37	73	127	69	80	108
36	58	51	137	104	49
35	37	28	42	37	42
18-34	543	993	950	978	741
Total	1,084	1,522	1,540	1,681	1,355
	% of Vessel Movements				
41	0.1%	0.0%	0.0%	0.0%	0.3%
40	5.6%	2.6%	1.8%	3.1%	14.2%
39	16.5%	10.6%	13.9%	16.9%	9.2%
38	12.2%	8.0%	6.6%	8.7%	6.9%
37	6.7%	8.3%	4.5%	4.8%	8.0%
36	5.4%	3.4%	8.9%	6.2%	3.6%
35	3.4%	1.8%	2.7%	2.2%	3.1%
18-34	50.1%	65.2%	61.7%	58.2%	54.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Source: USACE, Waterborne Commerce of the U.S., Part 3, 2001-2005.

Crude Petroleum Imports Transportation Savings Benefits

Transportation savings benefits from reductions in the vessel operating costs were calculated based on the relative difference in transportation costs between the without-project and with-project conditions. Transportation costs and savings were calculated for vessels that minimize transportation costs given trade route constraints. As previously noted, long-term fleet selection will continue to reflect goals of minimizing vessel operating costs. Table 42 summaries the transportation cost by trade route used to calculate the without- and with-project future conditions. The per ton transportation costs correspond to the least cost method of shipment associated with the particular trade route.

Review of the depths at trading ports and significant savings per ton indicates that nearly all crude petroleum from Mexico, Venezuela, and Trinidad would utilize 45 feet. An increase in Texas City's channel depth allows the existing range of 90,000 to 120,000 DWT vessels to carry approximately 20 percent more cargo, and the channel depths at the ports-of-origin are equipped to facilitate this transition. Expectations concerning the percentage of Middle East and Africa movements are subject to greater uncertainty. Nearly all Middle East tonnage is lightered and nearly all West Africa crude is lightened. The logistics associated with these offshore transfers introduces higher degrees of uncertainty than with direct shipment and, therefore, generates large cost variances. Additionally, and as the Table 42 presentation illustrates, the cost savings for offshore transfer is lower than with direct shipment; however, distinct cost savings are apparent.

TABLE 42
Texas City Crude Petroleum Imports
Transportation Cost and Savings EGM 05-01 Vessel Costs
Most Likely Transportation Mode
Trade Route and Channel Depth

Trade Route/Depth	**40 ft.**	**43 ft.**	**44 ft.**	**45 ft.**	**48 ft.**	**50 ft.**
Mexico	Direct	Direct	Direct	Direct	Direct	Direct
cost/ton	$2.19	$1.93	$1.86	$1.80	$1.67	$1.61
savings/ton		$0.26	$0.33	$0.39	$0.52	$0.58
Central and S America	Direct	Direct	Direct	Direct	Direct	Direct
cost/ton	$4.29	$3.74	$3.61	$3.49	$3.23	$3.15
savings/ton		$0.55	$0.68	$0.80	$1.06	$1.14
Trinidad	Direct	Direct	Direct	Direct	Direct	Direct
cost/ton	$5.01	$4.47	$4.32	$4.17	$3.83	$3.66
savings/ton		$0.54	$0.69	$0.84	$1.18	$1.35
W. Africa and North Sea	Lighten	Lighten	Lighten	Lighten	Direct	Direct
cost/ton	$9.09	$9.04	$9.04	$9.04	$8.38	$7.90
savings/ton		$0.05	$0.05	$0.05	$0.71	$1.19
Middle East	Lighter	Lighter	Lighter	Lighter	Lighter	Lighter
cost/ton	$11.99	$11.92	$11.64	$11.63	$11.59	$11.59
Savings/ton		$0.07	$0.35	$0.37	$0.40	$0.40

The savings for lightering movements result from increases in shuttles loads due to greater channel depth in Texas City. For lightering, the effect of increasing channel depths at Texas City allows for the reduction in the number of shuttles necessary to totally lighter a VLCC. The savings for lightened movements result from decreases in offshore unloading time from the mother vessel to shuttles. For lightening, the mother vessel is substituting offshore unloading time for dock-side unloading time. Additionally, the shuttle vessel reduces its overall loading and unloading time. Lightening generates comparatively lower savings than lightering because the latter produces the possibility of reducing the number of shuttles needed. Examination of the cost data also revealed that as channel depth increases the resulting savings may provide incentive to switch from lightening to direct shipment for movements from Africa and the North Sea. Table 43 presents the direct shipment cost for all routes. Comparison of the Africa/North Sea direct shipment cost (Table 43) with the lightening cost presented in Table 44 illustrates that this effect takes place at 48 feet. The lower the cost difference between direct versus offshore transfer costs, the higher the probability of direct shipment becomes. Alternatively, it was found that the efficiencies of offshore transfers are great and have increased in the last 10 to 15 years.

TABLE 43

Crude Petroleum Transportation Cost Per Ton EGM 05-01 Vessel Costs **for Direct Shipments to Texas City**

Channel Depth	40 ft.	43 ft.	44 ft.	45 ft.	48 ft.	50 ft.
DWT	**Mexico to Texas City Cost Per Ton by Vessel Size (Direct)**					
80,000	$2.16	$1.92	$1.86	$1.79	$1.80	$1.79
90,000	$2.05	$1.83	$1.77	$1.71	$1.66	$1.66
100,000	$2.16	$1.93	$1.86	$1.80	$1.63	$1.58
110,000	$2.21	$1.97	$1.90	$1.84	$1.67	$1.57
120,000	$2.36	$2.10	$2.02	$1.96	$1.77	$1.67
135,000	$2.19	$1.96	$1.90	$1.84	$1.67	$1.57
150,000	$2.13	$1.91	$1.84	$1.78	$1.62	$1.53
165,000	$2.12	$1.89	$1.83	$1.77	$1.61	$1.51
175,000	$2.17	$1.93	$1.87	$1.80	$1.64	$1.54
	Central and South America to Texas City Cost Per Ton by Vessel Size (Direct)					
80,000	$4.25	$3.78	$3.64	$3.52	$3.52	$3.52
90,000	$4.05	$3.61	$3.49	$3.37	$3.26	$3.26
100,000	$4.20	$3.75	$3.62	$3.50	$3.17	$3.08
110,000	$4.32	$3.85	$3.71	$3.59	$3.25	$3.06
120,000	$4.54	$4.04	$3.89	$3.76	$3.40	$3.20
135,000	$4.24	$3.78	$3.65	$3.53	$3.21	$3.02
150,000	$4.13	$3.69	$3.56	$3.44	$3.13	*$2.95*
165,000	$4.13	$3.68	$3.55	$3.43	$3.11	$2.93
175,000	$4.19	$3.73	$3.60	$3.48	$3.15	$2.96
	Trinidad to Texas City Cost Per Ton by Vessel Size (Direct)					
80,000	$5.03	$4.47	$4.31	$4.16	$4.17	$4.16
90,000	$4.79	$4.27	$4.13	$3.99	$3.86	$3.86
100,000	$4.97	$4.43	$4.27	$4.13	$3.75	$3.63
110,000	$5.11	$4.55	$4.39	$4.24	$3.84	$3.61
120,000	$5.36	$4.76	$4.59	$4.43	$4.01	$3.77
135,000	$5.00	$4.46	$4.31	$4.17	$3.78	$3.56
150,000	$4.83	$4.32	$4.20	$4.06	$3.69	$3.48
165,000	$4.76	$4.24	$4.09	$3.96	$3.62	$3.43
175,000	$4.94	$4.40	$4.24	$4.10	$3.71	$3.50
	West Africa and North Sea to Texas City Cost Per Ton by Vessel Size (Direct)					
80,000	$11.52	$10.24	$9.87	$9.53	$9.53	$9.53
90,000	$10.99	$9.80	$9.45	$9.14	$8.84	$8.84
100,000	$11.33	$10.09	$9.74	$9.41	$8.54	$8.28
110,000	$11.67	$10.38	$10.01	$9.67	$8.76	$8.24
120,000	$12.15	$10.78	$10.39	$10.03	$9.07	$8.53
135,000	$11.35	$10.12	$9.77	$9.44	$8.57	$8.08
150,000	$11.10	$9.90	$9.55	$9.23	$8.38	*$7.90*
165,000	$11.11	$9.89	$9.55	$9.22	$8.37	$7.88
175,000	$11.22	$9.98	$9.62	$9.29	$8.42	$7.92
	Middle East to Texas City Cost Per Ton by Vessel Size Direct					
80,000	$19.28	$17.13	$16.51	$15.94	$15.94	$15.94
90,000	$18.39	$16.40	$15.82	$15.29	$14.79	$14.79
100,000	$18.94	$16.87	$16.27	$15.72	$14.26	$13.83
110,000	$19.52	$17.35	$16.73	$16.15	$14.64	$13.77
120,000	$20.26	$17.97	$17.32	$16.72	$15.12	$14.22
135,000	$18.94	$16.89	$16.30	$15.75	$14.30	$13.47
150,000	$18.54	$16.52	$15.95	$15.41	$13.99	*$13.18*
165,000	$18.56	$16.52	$15.94	$15.40	$13.97	$13.15
175,000	$18.73	$16.65	$16.05	$15.50	$14.05	$13.22

TABLE 44
Texas City Crude Petroleum Imports
Lightened Cost Per Ton by Channel Depth and Trade Route
EGM 05-01 Vessel Costs

	Channel Depth (ft.) and Vessel DWT					
Mother Vessels (DWT)	**40 ft.**	**43 ft.**	**44 ft.**	**45 ft.**	**48 ft.**	**50 ft.**
Minimum	135,000	135,000	135,000	135,000	135,000	135,000
Maximum	175,000	175,000	175,000	175,000	175,000	183,000
Shuttle Vessels (DWT)						
Minimum	60,000	56,667	47,000	42,500	35,000	30,000
Maximum	85,000	72,500	70,000	65,000	56,667	56,667
W. Africa and North Sea	**Per Ton Transportation Cost to Texas City**					
Minimum	$8.68	$8.68	$8.68	$8.68	$8.62	$8.53
Mean	$9.09	$9.04	$9.04	$9.04	$8.92	$8.82
Maximum	$9.50	$9.40	$9.40	$9.40	$9.22	$9.11
Middle East	**Per Ton Transportation Cost to Texas City**					
Minimum	$12.92	$12.63	$12.65	$12.65	$12.65	$12.09
Mean	$13.32	$12.99	$13.00	$13.00	$13.00	$12.37
Maximum	$13.73	$13.35	$13.35	$13.35	$13.35	$12.66

Under the current and future without- and with-project conditions, the "mother vessels" offload partial cargoes to shuttle vessels and both vessels come into port. The lightened mother vessels were modeled in the ERDC ship simulation. These "lightened mother vessels" are the "design vessels". The analysis for the offshore transfer process was based exclusively on operating costs. The duration of the transfer, number of shuttle tankers, supply boats, and equipment was estimated in terms of a "range of time" and the costs for vessels and equipment were determined. The shuttle vessel costs and additional pilot and tug charges were identified.

For the purpose of this analysis, transfers from lightening to direct shipment were not assumed to transpire for depths less than 48 feet. Comparison of the direct shipment cost for the Middle East (Table 42) with lightering cost presented in Table 45 shows that lightering is always the least cost shipping choice regardless of channel depth. Comparison of lightering cost for Africa and North Sea routings also illustrates that lightering would be the least cost alternative for that route; however, nearly all of Texas City's tonnage for this group is from Africa and lightening is presently not an alternative. It may be in the future.

TABLE 45

Texas City Crudé Petroleum Imports

Lightering Cost Per Ton by Channel Depth Alternative and Trade Route

EGM 05-01 Vessel Costs

Depth:	40 ft.	43 ft.	44 ft.	45 ft.	48 ft.	50 ft.
West Africa and North Sea Per Ton Transportation Cost						
Minimum	$6.98	$6.91	$6.71	$6.69	$6.54	$6.57
Mean	$7.12	$7.04	$6.83	$6.77	$6.72	$6.72
Maximum	$7.32	$7.20	$6.98	$6.97	$6.97	$6.97
Middle East Per Ton Transportation Cost						
Minimum	$11.85	$11.78	$11.58	$11.57	$11.42	$11.44
Mean	$11.99	$11.93	$11.64	$11.63	$11.59	$11.59
Maximum	$12.20	$12.08	$11.86	$11.85	$11.85	$11.85

As noted, direct shipment would not be the shipping method of choice for Middle East routings, and lightening is the least cost shipping method for Africa and North Sea tonnage and lightering is the least cost for Middle East routings. Table 46 summarizes the transportation cost savings based on the least cost shipping methods displayed in Table 42. The Table 46 presentation illustrates relatively significant changes in benefits between 43 and 44 feet is the result of a reduction in the number of shuttles needed to offload the contents of the mother vessel. The 44-foot depth allows for the reduction in 1 shuttle trip by lightering operation. The 45-foot depth also allows for some reduction. The increase in channel depth reduces the cost per ton for lightering by reducing the number of shuttle vessels to transport a given volume of crude oil.

TABLE 46
Texas City Crude Petroleum Imports Annual Transportation Savings ($1,000's) by Representative Trade Route and Decade Channel Depth Alternative, Year, and Representative Origin
EGM 05-01 Vessel Costs

43-foot Channel	2000-04	2010	2020	2030	2040	2050	2060
Mexico	$1,112	$1,146	$1,325	$1,668	$1,843	$2,036	$2,249
Central/South America	$2,909	$3,667	$4,891	$6,137	$6,779	$7,488	$8,271
Trinidad	$1,730	$2,350	$3,245	$3,965	$4,380	$4,838	$5,344
Europe & Africa	$504	$573	$668	$821	$907	$1,002	$1,107
Middle East	$1,060	$1,249	$1,479	$1,833	$2,025	$2,237	$2,471
Total Savings	$7,316	$8,985	$11,607	$14,424	$15,933	$17,600	$19,442

44-foot Channel	2000-04	2010	2020	2030	2040	2050	2060
Mexico	$1,412	$1,455	$1,681	$2,117	$2,339	$2,584	$2,854
Central/South America	$3,597	$4,534	$6,046	$7,587	$8,381	$9,258	$10,226
Trinidad	$2,211	$3,003	$4,147	$5,066	$5,596	$6,182	$6,829
Europe & Africa	$504	$573	$668	$821	$907	$1,002	$1,107
Middle East	$4,998	$5,888	$6,976	$8,066	$8,910	$9,842	$10,872
Total Savings	$12,722	$15,453	$19,518	$23,658	$26,133	$28,867	$31,888

45-foot Channel	2000-04	2010	2020	2030	2040	2050	2060
Mexico	$1,669	$1,719	$1,987	$2,502	$2,764	$3,054	$3,373
Central/South America	$4,232	$5,334	$7,114	$8,926	$9,860	$10,891	$12,031
Trinidad	$2,691	$3,656	$5,048	$6,168	$6,813	$7,526	$8,313
Europe & Africa	$504	$573	$668	$821	$907	$1,002	$1,107
Middle East	$5,231	$6,162	$7,301	$8,442	$9,325	$10,301	$11,379
Total Savings	$14,327	$17,445	$22,117	$26,859	$29,670	$32,774	$36,203

48-foot Channel	2000-04	2010	2020	2030	2040	2050	2060
Mexico	$2,225	$2,293	$2,649	$3,337	$3,686	$4,071	$4,497
Central/South America	$5,607	$7,068	$9,425	$11,827	$13,064	$14,431	$15,941
Trinidad	$3,780	$5,136	$7,092	$8,664	$9,571	$10,572	$11,678
Europe & Africa	$7,928	$9,002	$10,491	$11,663	$12,884	$14,232	$15,720
Middle East	$5,727	$6,747	$7,994	$9,243	$10,210	$11,278	$12,458
Total Savings	$25,267	$30,245	$37,651	$44,734	$49,415	$54,584	$60,295

50-foot Channel	2000-04	2010	2020	2030	2040	2050	2060
Mexico	$2,481.54	$2,557.10	$2,954.72	$3,721.66	$4,111.03	$4,541.13	$5,016.23
Central/South America	$6,031	$7,601	$10,137	$12,720	$14,050	$15,520	$17,144
Trinidad	$4,325	$5,876	$8,113	$9,912	$10,949	$12,095	$13,360
Europe & Africa	$12,854	$14,595	$17,011	$19,681	$24,015	$24,015	$26,528
Middle East	$5,738	$6,759	$8,009	$9,260	$10,229	$11,299	$12,481
Total Savings	$31,429	$37,389	$46,224	$55,295	$63,355	$67,470	$74,529

Petroleum Product Transportation Savings Benefits

Reductions in the vessel operating costs for Texas City's foreign petroleum product imports and exports and coastwise shipments were calculated based on the relative difference in transportation costs between the without-project and with-project conditions. As with crude petroleum, transportation costs and savings were calculated for vessels that minimize transportation costs given trade route constraints. Again, long-term fleet selection will continue to reflect goals of minimizing vessel operating costs. Table 47 summarizes the annual transportation savings benefits for petroleum product imports and exports. Table 48 summarizes the benefit calculations for coastwise product shipments.

TABLE 47
Texas City Petroleum Product Imports and Exports
Annual Transportation Savings ($1,000) EGM 05-01 Vessel Costs
by Representative Trade Route and Decade

Trade Route and Year	2001-03	2010	2020	2030	2040	2050	2060
Europe and Africa (65%)		**43-foot Channel Imports Transportation Cost**					
Latin America (35%)	$727	$973	$1,274	$1,449	$1,649	$1,876	$2,134
		43-foot Channel Exports Transportation Cost					
(75% Europe/25% Brazil)	$139	$150	$158	$164	$170	$177	$184
Total Savings	$866	$1,124	$1,432	$1,614	$1,819	$2,053	$2,318
Europe and Africa (65%)		**44-foot Channel Imports Transportation Cost**					
Latin America (35%)	$951	$1,271	$1,662	$1,891	$2,152	$2,448	$2,786
		44-foot Channel Exports Transportation Cost					
(75% Europe/25% Brazil)	$179	$193	$203	$211	$219	$228	$237
Total Savings	$1,130	$1,464	$1,865	$2,102	$2,371	$2,676	$3,023
Europe and Africa (65%)		**45-foot Channel Imports Transportation Cost**					
Latin America (35%)	$1,148	$1,534	$2,005	$2,282	$2,596	$2,954	$3,361
		45-foot Channel Exports Transportation Cost					
(75% Europe/25% Brazil)	$216	$233	$245	$255	$265	$275	$286
Total Savings	$1,364	$1,767	$2,251	$2,537	$2,861	$3,229	$3,647
Europe and Africa (65%)		**48-foot Channel Imports Transportation Cost**					
Latin America (35%)	$1,662	$2,222	$2,907	$3,307	$3,763	$4,281	$4,871
		48-foot Channel Exports Transportation Cost					
(75% Europe/25% Brazil)	$314	$338	$356	$369	$384	$399	$414
Total Savings	$1,976	$2,561	$3,263	$3,677	$4,147	$4,680	$5,285
Europe and Africa (65%)		**50-foot Channel Imports Transportation Cost**					
Latin America (35%)	$1,662	$2,222	$2,907	$3,307	$3,763	$4,281	$4,871
		50-foot Channel Exports Transportation Cost					
(75% Europe/25% Brazil)	$314	$338	$356	$369	$384	$399	$414
Total Savings	$1,976	$2,561	$3,263	$3,677	$4,147	$4,680	$5,285

TABLE 48
Petroleum Product Coastwise Shipments
Vessel Data, Base Tonnage, and Transportation Savings Benefit Summary
EGM 05-01 Vessel Costs

Origin-Destination Data

Shipments to Pt Everglades from Texas City

Initial % of total outbound shipments: 10.0%

Round trip mileage: 2,450

Vessel Input Data and Transportation Cost

Channel Depth (ft)	Design Draft (ft)	Vessel DWT	No. of feet Light-Loaded	Cargo by Channel Depth	Round Trip Voyage Cost	Loading and Unloading Cost	Tug Cost	Total Cost	Cost Per Ton
40	43	45000	6	30,871	$272,541	$16,947	$7,319	$296,807	$9.61
45	43	45000	2	37,890	$272,541	$20,800	$7,422	$300,763	$7.94
								Saving/ton	$1.68

Texas City Domestic Coastwise Petroleum Product Tonnage

Year	Total Short Tons	Short Tons Used for Benefits
2001	4,590,136	459,014
2002	3,091,890	309,189
2003	3,962,795	396,280
2001-03 Average		388,161
% of Total		10%

Texas City Domestic Coastwise Petroleum Product Annual Transportation Benefits

Year	Total Tonnage	Used for Benefits	Percentage Used for Benefits	Annual Savings
2001/03	3,881,607	388,161	10%	$650,858
2010	4,304,147	430,415	10%	$721,709
2020	4,897,580	979,516	20%	$1,642,429
2030	5,572,833	1,114,567	20%	$1,868,878
2040	6,341,186	1,268,237	20%	$2,126,549
2050	7,215,475	1,443,095	20%	$2,419,746
2060	8,210,307	1,642,061	20%	$2,753,368

Summary of Average Annual Benefits and Costs

Table 49 presents the transportation cost savings for crude petroleum and petroleum product imports. These 2 commodity groups comprise 95 percent of total deepening benefits. The remaining 5 percent are for coastwise product shipments. Table 50 summarizes the benefit cost analysis, including the first cost of construction, net excess benefits, and the benefit-to-cost ratio. The first cost shown in Table 49 was calculated based on a fuel cost of $1.12 per gallon. The 50-foot channel depth provides the highest net excess benefits. The 45-foot channel alternative is the locally preferred plan.

TABLE 49

Transportation Savings ($1000) by Channel Depth and Commodity Group

EGM 05-01 Vessel Costs

Crude Petroleum Imports					
Transportation Savings by Channel Depth 2010-2060					
Year	43	44	45	48	50
2010	$8,985	$15,453	$17,445	$30,245	$37,389
2020	$11,607	$19,518	$22,117	$37,651	$46,224
2030	$14,424	$23,658	$26,859	$44,734	$55,295
2040	$15,933	$26,133	$29,670	$49,415	$63,355
2050	$17,600	$28,867	$32,774	$54,584	$67,470
2060	$19,442	$31,888	$36,203	$60,295	$74,529
Average Annual Benefits (50-Year Period of Analysis at 4.875%)					
2010-60	$12,743	$21,232	$24,067	$40,640	$50,418
Petroleum Product Import and Export Tonnage (Includes Coastwise Domestic)					
Transportation Savings by Channel Depth 2010-2060					
Year	43	44	45	48	50
2010	$1,845	$2,186	$2,489	$3,282	$3,282
2020	$3,075	$3,508	$3,893	$4,905	$4,905
2030	$3,482	$3,971	$4,406	$5,546	$5,546
2040	$3,946	$4,498	$4,988	$6,273	$6,273
2050	$4,472	$5,096	$5,649	$7,100	$7,100
2060	$5,071	$5,776	$6,401	$8,038	$8,038
Average Annual Benefits (50-Year Period of Analysis at 4.875%)					
2010-60	$3,125	$3,583	$3,991	$5,060	$5,060
Total Average Annual Benefits (50-Year Period of Analysis at 4.875%)					
Total	$15,868	$24,815	$28,058	$45,700	$55,477

TABLE 50
Economic Summary Data at 4.875%
($1000 and EGM 05-01 Vessel Costs

Channel Depth (ft):	43	44	45	48	50
First Cost of Construction a/	$34,219	$42,446	$52,652	$107,087	$145,065
Period of Construction	24	24	24	48	60
Interest During Construction Period	$1,647	$2,043	$2,535	$10,890	$18,833
Non-Federal Associated Cost	$2,217	$2,439	$2,683	$2,951	$3,246
Archaeology Mitigation Cost	$1,108	$1,108	$1,108	$1,108	$1,108
Total Project Construction Cost	$39,191	$48,036	$58,978	$122,036	$168,252
Average Annual Construction Cost	$2,105	$2,581	$3,168	$6,556	$9,039
Average Annual O&M Incremental Cost	$139	$139	$139	$2,000	$4,000
Total Average Annual Cost	$2,244	$2,720	$3,307	$8,556	$13,039
Average Annual Benefits	$15,868	$24,815	$28,058	$45,700	$55,477
Net Excess Benefits	$13,623	$22,095	$24,750	$37,144	$42,439
BCR	7.1	9.1	8.5	5.3	4.3

a/ Calculated Using $1.12 per gallon fuel cost.

Sensitivity Analyses

Sensitivities were evaluated for tonnage growth, vessel underkeel clearance, and the recently released FY2008 vessel operating costs. The sensitivity effects were assessed in relationship to the net excess benefits summarized in the bottom portion of Table 50.

Tonnage Forecast Sensitivity

The project benefit estimates were reevaluated using alternative crude and petroleum product import forecasts. An additional sensitivity was prepared using the EIA AEO2007 projections. The AEO2007 application was prepared late in the study analysis as it was not initially available.

The first sensitivity presented compares the Petroleum Industry Research Associates, Inc. (PIRA) and Global Insight projections with the AEO 2006 reference forecast. The 3 forecasts are displayed in Table 51. As noted in Table 51, the EIA reference and Global Insight 2004-30 compound annual growth rates of 1 percent for U.S. crude petroleum imports are higher than PIRA's growth rate of 0.4 percent. For petroleum products imports, EIA reference and Global Insight shows respective compound annual growth of 2.3 and 5.1 percent for 2004-30 and PIRA shows zero growth. The effect of these growth rates were evaluated and compared with the Texas City's baseline benefit application summarized in Table 49. As discussed earlier, Texas

City's baseline forecast incorporates using 1975-2003 U.S. crude petroleum imports and year as independent variables and Texas City tonnage as the dependent variable. An additional equation, using U.S. imports as the sole independent variable, was evaluated as well. The output statistics associated with the latter were somewhat weaker with higher residuals than when both U.S. imports and year were used. Another alternative, a relatively basic methodology, is to simply apply the EIA 2003-2030 growth rates to Texas City's recent tonnage.

TABLE 51
Comparison of Petroleum Forecasts, 2004-30
(Millions of barrels per day)

Forecaster	2004	2015	2030	Average Annual Growth Rate
	Crude Petroleum Imports			
EIA Reference	10.06	10.47	13.51	1.1%
PIRA Energy Group	10.06	9.65	11.24	0.4%
Global Insight	10.06	11.28	13.01	1.0%
	Petroleum Product Imports			
	2004	2015	2030	
EIA Reference	2.05	2.76	3.73	2.3%
PIRA Energy Group	2.05	2.22	2.04	0.0%
Global Insight	2.05	4.22	7.44	5.1%

Source: U.S. Department of Energy, Energy Information Administration, December 2005, p. 115.

Use of this growth rate application assumes that Texas City imports will grow at exactly the same rate as U.S. imports. This forecast generates greater uncertainty than the regression based forecast due to utilization of a specific base point. Table 52 displays comparison of Texas City's crude petroleum import forecast using various base year selections; the regression based forecast is also shown. The regression based forecast, which is displayed for comparison in the bottom right column of Table 52, is statistically strong. The obvious weakness of regression based forecasts is unforeseen structural changes in the U.S. economy and the PIRA forecast reflects that possibility. As previously discussed, Texas City's import trends exhibited higher growth rates than either the nation or the U.S. Gulf Coast Petroleum Administration District (PADD III), Texas City's 1999-03 average annual growth for crude petroleum imports is 12 percent per annum while U.S. and PADD III respective rates are 3 percent and 1 percent. Evaluation of Texas City growth rates for the 1985- and 1990-03 expanded period also reveal long-term growth exceeding national and regional rates. Analysis of the historical trend suggests that Texas City growth will be somewhat higher than the U.S. or PADD III rates and, therefore, use of a long-term regression equation base helps to address issues associated with base year determination.

TABLE 52
U.S. EIA Forecast and Texas City Application

Year	Millions of Barrels Per Day	1000's of Barrels	1000's of Short tons
	U.S. Crude Petroleum Imports (Base Data) a/		
2001	10.00	3,404,894	479,318
2002	10.20	3,336,175	486,249
2003	9.65	3,527,696	515,747
2004	10.09	3,692,063	
2010	10.05	3,677,426	530,485
2020	11.26	4,120,181	594,354
2030	13.51	4,943,486	713,119

Texas City Crude Petroleum Imports
1000's of short tons

Year	Short Tons
2001	38,688
2002	32,897
2003	38,773
2004	42,845

Texas City (1000's of short tons)
Application of Alternative Forecasts
Crude Petroleum Imports

	Growth Rate Application			Regression Based Forecast
Base Year	2001-03	2003	2004	n/a
Base Year Tonnage	39,521	38,773	42,845	n/a
2010	44,279	40,419	42,675	43,680
2020	53,127	45,285	47,813	53,246
2030	39,521	54,334	57,367	64,351

a/ The historical time series data displayed at the EIA websites is generally presented in thousands of barrels, while the EIA forecast volumes are generally presented in millions barrels per day. The regression equations were prepared using the historical time series data. U.S. imports are shown in barrels, BPD, and short tons to aid in data tracking.

Summarization of the effects of the alternative forecasts on the net excess benefits and benefit-cost ratios are displayed in Table 53. Table 54 displays comparison of the recommended plan with 2003 based "no growth forecasts". The no growth scenario assumes major changes in social-political circumstances and phasing out of crude petroleum.

TABLE 53

Economic Summary Data at 4.875 %

Using Comparative Forecasts (Dollars in 1000's)

EGM 05-01 Vessel Costs

	Texas City Project Cost
Channel Depth	45 feet
First Cost of Construction	$52,652
Interest During 2-Year Construction Period	$2,535
Non-Federal Associated Cost	$2,683
Archaeology Mitigation Cost	$1,108
Total Project Construction Cost	$58,977
Average Annual Construction Cost	$3,168
Average Annual O&M Incremental Cost	$139
Total Average Annual Cost	$3,307

Texas City Channel

Application of Alternative Forecasts for

Crude Petroleum and Petroleum Product Imports a/

Forecast	Current Tonnage Volumes	PIRA (Regression Based Forecasts b/)	Global Insights (Regression Based Forecasts b/)	EIA Reference (Regression Based Forecasts b/)	Direct Application of Growth Rates c/ EIA Reference	Direct Application of Growth Rates c/ PIRA
Average Annual Benefits	$10,831	$24,200	$31,885	$28,058	$22,998	$19,958
Net Excess Benefits	$7,528	$20,897	$28,582	$24,750	$19,695	$16,655
B/C Ratio	3.3	7.3	9.7	8.5	7.0	6.0

a/ An additional sensitivity using foreign-flag tanker costs for U.S. coastwise product shipments was also evaluated but is not shown in this Table. The affect of using foreign-flag tankers instead of U.S. flag tankers reduces the average annual benefits by approximately 3 percent and, therefore does not have an effect on average annual benefits.

b/ Forecasts were prepared using regression equation of Texas City imports as a function of U.S. Imports and Year. Table 13 shows the equation.

c/ Direct application forecasts were prepared by applying the national forecast growth rates to Texas City's 2001-03 average tonnage. The years 2001-03 were used for the U.S. total base tonnage.

TABLE 54
Economic Summary Data at 4.875 %
Comparison of Recommended Plan with No Growth Tonnage-Based Forecast
(Dollars in 1000's) and EGM 05-01 Vessel Costs

	Base Plan From Table 49	2003 Tonnage Volumes	Declining Petroleum Volumes a/
Channel Depth	45 ft.	45 ft.	45 ft.
First Cost of Construction	$52,652	$52,652	$52,652
Interest During Construction	$2,535	$2,535	$2,535
Non-Federal Associated Cost	$2,683	$2,683	$2,683
Archaeology Mitigation Cost	$1,108	$1,108	$1,108
Total Project Construction Cost	$58,978	$58,978	$58,978
Average Annual Construction Cost	$3,168	$3,168	$3,168
Average Annual O&M	$139	$139	$139
Total Average Annual Cost	$3,307	$3,307	$3,307
Average Annual Benefits	$28,058	$20,636	$18,241
Net Excess Benefits	$24,751	$17,329	$14,934
B/C Ratio	8.5	6.2	5.5

a/ Petroleum tonnage declines approximately 1.1 percent per annum.

Vessel Underkeel Clearance Sensitivity

The Texas City Vessel Pilots were consulted to help in understanding vessel underkeel clearance practices. While the pilots' general policy is to allow a maximum loaded draft of 39.6 feet mean low tide, they will consider deeper loaded drafts or restrict vessels to something less depending on tide, current, and winds, and vessel conditions. Underkeel calls are made on a case-by-case basis and the specifics for a reoccurring vessel will vary on a daily/hourly basis. Decisions are largely dependent upon weather and tide conditions. Additionally, while one company is strict about using 3 feet of clearance, the effect of 3-foot underkeel does not necessarily mean that their vessels are loaded to 37 feet, but rather that there is at least 3 feet between the keel and the controlling channel depth. Controlling channel depth may range from 39 to 44 feet, with the variance being dependent on the point within the channel maintenance dredging cycle.

As a basis for pilot discussion, Tables 55 and 56 were prepared. Table 55 shows 2001-2004 annual crude petroleum import tonnage by loaded draft. The data presented was compiled from the Corps detailed waterborne commerce database and it differs from the information presented in the gray book (IWR-WCUS) in that the gray book presentation is based on vessel trips and is not commodity specific. The database has the advantage of allowing for isolation of specific vessel records. A short-coming of the foreign cargo database is that it is organized by commodity and while trip counts can be estimated from the data presented, a specific trip field is not contained in the database.

TABLE 55
Texas City Channel
Percentage of Crude Petroleum Import Tonnage by Loaded Draft (ft)

Loaded Draft (ft)	2001	2002	2003	2004
<=34	24.3%	18.8%	32.9%	25.9%
37	12.5%	20.9%	6.7%	7.9%
38	22.7%	22.8%	16.1%	15.6%
39	30.6%	33.2%	39.4%	45.9%
40	9.9%	4.2%	4.8%	4.7%
Weighted Draft (ft)	37.3	37.4	37.0	37.3

Source: USACE, Waterborne Commerce of the U.S., detailed database.

Table 56 shows the controlling channel depth for three distinct survey periods. Most vessel operators and pilots rely on the "inside depths" shown in Table 56 as a primary variable in deciding whether to allow vessel transit; however, the outside depth was noted as a consideration for some operators. Again, it was emphasized that decisions varies on a daily and sometimes hourly basis.

TABLE 56
Texas City Channel Minimum Depths (Mean Low Tide in feet)
Reach leading to the TC Turning Basin and Crude Oil Docks

Date	Left Outside	Left Inside	Right Inside	Right Outside
	Minimum Between Cross-Sections 30+000 and 3+400			
September 2001	39.09	43.38	44.06	42.10
December 2002	34.80	42.63	41.57	38.10
July 2003	32.40	40.80	39.56	35.83

Source: USACE, Galveston District, Operations Branch.

During winter months, vessels are routinely loaded ½ to 1-foot lighter than during other seasons. The practice of lighter winter loads is done to avoid delays due to waiting for higher tides or a return to prevailing southeast winds. In helping to understand the channel depths shown in Table 56, the operators noted that 39.56 feet shown for July 2003 for the right inside channel probably equates to 38.6 feet salt water. A depth of 39.6 feet in salt water generally corresponds to 40.6 feet in the relative brackish water of the Texas City Channel. It is understood that the vessel drafts are recorded at the dock; however, the precision of the data is subject to some level of variance and uncertainty. For instance, the gray book records show a few vessel transits at 41 feet but the detailed database does not show any loaded drafts greater than 40 feet. Adding to potential variability it was noted that vessels burn off bunker fuel while in-transit and this results in reductions in vessel draft readings.

While the vessel operators emphasized that the Table 55 and 56 data are not comparative, it was agreed that the vessels with 40-foot loaded drafts shown in Table 55 generally have a minimum of 1-foot underkeel clearance and, therefore, are operating on a channel with a mean low tide of 41 feet or more. Additionally, it was noted that vessels showing loaded drafts of 40 feet may have 4 feet underkeel at some point during any given year while only having one foot at other times. The variance is dependent on the point within the maintenance dredging cycle and weather, wind, and tide conditions. Discussion with the vessel operators suggested that one foot of underkeel was not as likely as 2 or more. Records showing loaded drafts of 40 feet tend to be associated with high tides or a recently completed dredging channel scenario. The operators are risk adverse and loading to maximum channel capacity may not only result in vessel and property damages but may also result in significant delays due to waiting upon a one-foot tidal increase. It was also emphasized that a 5-foot increase in channel depth would result in a 5-foot increase in average loaded drafts. Throughout the discussions, it was also emphasized that the loaded drafts shown in Table 56 do not provide much, if any, indication of underkeel clearance.

While the pilots did not provide conclusive indications of the most likely underkeel clearance, they concurred that the minimum underkeel clearance was one foot and the most common was more than one foot. Given this variability the effect of an underkeel clearance range between zero and four feet was subsequently reviewed to help determine resulting degrees of change in the annual transportation savings estimates. Table 57 summarizes the results of this exercise. The presentation reveals surprisingly, but relatively, small changes in transportation cost savings. The irregular variability between underkeel and transportation savings relates to relatively inefficient vessel size for shuttle vessel selection. For instance, a one-foot increase or decrease in underkeel clearance may result in a slightly smaller or larger shuttle size, which in turn may generate increases or decreases in cost per ton efficiencies. Economic theory suggests that vessel size selection will gravitate to the most efficient vessel sizes. Transitions in the shuttle vessel fleet will be a likely outcome to changes in channel depth and any subsequent changes in operating practices such as underkeel clearance.

TABLE 57
Texas City Channel
Comparison of Average Annual Benefits
Underkeel Clearance Sensitivity
EGM 05-01 Vessel Costs

Feet of Underkeel Clearance	Average Annual Transportation Savings Benefits ($1,000's) at 4.875%
0	$25,412
1	$24,026
2	$25,964
3	$28,058
4	$29,440

In addition to running various underkeel clearance scenarios, a 42.5 foot without project condition was compared to a 47.5 foot with project condition. The basis for this exercise is that vessel operators have additional channel depth available after channel maintenance. The purpose of this comparison was to help determine how the relative difference in transportation savings between authorized project depths of 40 and 45 feet versus 42.5 and 47.5, with the latter depths being available during various periods. This analysis was performed using 3-foot of underkeel. The results showed annual savings 2 percent less than the savings between the 40- and 45-foot depths shown for the base plan in Table 50. The results of the underkeel sensitivity analyses suggest that the project benefit estimates presented in Table 49 provide a generally reasonable base.

Application of the AEO2007 Forecast Crude Petroleum Import Forecast

The AEO2006 reference forecast was used for Texas City's crude petroleum. The crude petroleum forecast presented in Table 14 incorporates the AEO2006 2003-30 projections into a regression equation estimated using Texas City and U.S. 1975-03 imports. The effect of using the more recent AEO2007 forecast and the inclusion of 2004-2005 Texas City tonnage was prepared In order to help understand how the inclusion of the more recent forecast and the more recent base year input would affect the results. The AEO2006 and AEO2007 U.S. crude oil import forecasts are shown in Table 58. The Table shows the EIA forecast, which is provided in barrels per day, in both barrels per year and short tons. The historic base input (i.e. crude oil imports) is generally provided in annual barrels and the Corps used short tons. The regression equation analysis used to prepare the forecast used Texas City crude oil imports in short tons as a function of Year and U.S. crude oil imports in annual barrels The U.S. and Texas City 1975-2005 crude petroleum import statistics used for the regression analysis are presented in Table 59. Table 60 provides comparison of the outputs from the 2 forecasts due to the similarity of the AEO2006 and AEO2007 forecasts. Evaluation of equations for the same time period but excluding year from the equations reduces the estimated import forecasts for 2010 by 14 percent and also produces less significant output statistics (i.e. R square, t values, and F statistic) and standard errors.

TABLE 58
Energy Information Administration (EIA)
Crude Petroleum Import Forecast
2010-2030

Year	EIA Millions of Barrels Per Day	Conversion of Barrels/Day to Annual Barrels Millions	Conversion of Annual Barrels to Short Tons
		Annual Energy Outlook 2006	
2010	10.05	3,677,426	551,143
2020	11.26	4,120,181	617,500
2030	13.51	4,943,486	740,890
		Annual Energy Outlook 2007	
2010	10.03	3,670,108	550,046
2020	11.33	4,145,795	621,339
2030	13.12	4,800,780	719,502

Source: U.S. Department of Energy, 2006 and 2007 Annual Energy Outlooks.

TABLE 59
Crude Oil Imports
Inputs for Texas City Regression Equation

	U.S. Totals		Texas City	
Year	1000's of Barrels	1000's of short tons	1000's of short tons	% of U.S.
1975	1,498,181	224,535	5,451	2.4%
1976	1,935,012	290,004	9,536	3.3%
1977	2,414,327	361,840	12,111	3.3%
1978	2,319,826	347,677	14,234	4.1%
1979	2,379,541	356,627	17,266	4.8%
1980	1,926,162	288,678	11,380	3.9%
1981	1,604,703	240,500	10,991	4.6%
1982	1,273,214	190,819	15,380	8.1%
1983	1,215,225	182,128	14,328	7.9%
1984	1,253,949	187,932	11,961	6.4%
1985	1,168,297	175,095	12,130	6.9%
1986	1,524,978	228,552	15,496	6.8%
1987	1,705,922	255,670	16,312	6.4%
1988	1,869,005	280,112	20,570	7.3%
1989	2,132,761	319,641	19,783	6.2%
1990	2,151,387	322,433	25,184	7.8%
1991	2,110,532	316,310	20,348	6.4%
1992	2,226,341	333,666	26,435	7.9%
1993	2,477,230	371,267	33,111	8.9%
1994	2,578,072	386,381	22,863	5.9%
1995	2,638,810	395,484	27,781	7.0%
1996	2,747,839	411,824	31,901	7.7%
1997	3,002,299	449,961	33,900	7.5%
1998	3,177,584	476,231	27,958	5.9%
1999	3,186,663	477,592	26,900	5.6%
2000	3,319,816	497,547	34,646	7.0%
2001	3,404,894	510,298	38,688	7.6%
2002	3,336,175	499,999	32,897	6.6%
2003	3,527,696	528,703	38,773	7.3%
2004	3,692,063	553,337	42,845	7.7%
2005	3,695,971	553,923	35,644	6.4%

TABLE 60
Comparison of Regression Equation Output
Using AEO2006 and AEO2007 Forecast
For Texas City Crude Oil Imports

Dependent Variable	TC Imports 1975-03	TC Imports 1975-05
Independent Variable	Year	Year
Independent Variable	U.S. Imports	U.S. Imports
Constant	-1,540,258	-1,528,985
Std Err of Y Estimate	3,029.90	3,109.33
Adjusted R Square	0.8992	0.9081
No. of Observations	29	31
Degrees of Freedom	2	2
X Coefficient: U.S. Crude Oil Imports	0.004	0.004
X Coefficient Level of Significance of t value	0.99999	0.99999
X Coefficient: Year	780.68	774.98
X Coefficient Level of Significance of t value	0.9961	0.9961
F Statistic	125.93	149.16
Significance of F statistic	0.99999	0.99999
U.S. Imports Barrels (Input)	AEO2006	AEO2007
2010	3,677,426	3,670,108
2020	4,120,181	4,145,795
2030	4,943,486	4,800,780
Estimated Texas City Tonnage (Output) 1000's of short tons		
2010	43,675	43,550
2020	53,260	53,222
2030	64,374	63,618

Application of the FY2008 Deep-Draft Tanker Costs

The final sensitivity presents application of the FY2008 foreign flag tanker costs. Table 61 presents comparison of the FY2005 and FY2008 foreign-flag double-hull tanker vessel operating costs. The FY2008 were recently released and are presented for sensitivity purposes.

Application of the FY2008 costs was evaluated for sensitivity purposes. The benefit estimates calculated using the FY2008 costs are presented in Table 62.

TABLE 61
DEEP-DRAFT FOREIGN FLAG TANKER VESSEL CHARACTERISTCS AND HOURLY VESSEL OPERATING COSTS (FY2005 AND FY2008)

Vessel DWT	Design Draft (ft)	Length (ft)	Beam (ft)	FY2005 Hourly Cost at Sea	FY2005 Hourly Cost in Port
20,000	30	498	80	$617	$475
25,000	32	531	85	$639	$490
30,000	34	586	95	$661	$505
35,000	35	586	95	$682	$520
50,000	40	650	107	$752	$570
60,000	42	685	113	$795	$600
70,000	43	717	119	$838	$630
80,000	42	745	124	$880	$660
90,000	43	771	129	$919	$687
120,000	52	839	141	$1,019	$749
150,000	55	895	152	$1,127	$820
175,000	58	936	160	$1,225	$888
200,000	60	973	167	$1,318	$951
265,000	66	1,056	182	$1,555	$1,111
325,000	70	1,121	195	$1,715	$1,201

Vessel DWT	Design Draft (ft)	Length (ft)	Beam (ft)	FY2008 Hourly Cost at Sea	FY2008 Hourly Cost in Port
20,000	32	509	77	$792	$456
25,000	33	539	83	$827	$479
50,000	39	654	105	$1,007	$600
60,000	41	689	112	$1,103	$672
70,000	43	721	118	$1,160	$706
80,000	45	749	124	$1,225	$747
90,000	46	775	129	$1,283	$781
110,000	50	822	138	$1,382	$833
150,000	56	899	154	$1,590	$945
165,000	59	924	159	$1,671	$991
175,000	70	1,057	187	$2,207	$1,290
265,000	73	1,094	194	$2,393	$1,393
320,000	75	1,114	198	$2,499	$1,452

TABLE 62
Texas City Transportation Cost Savings
Based on FY2008 Foreign Flag Tanker Costs
Based on July 2007 Deep-Draft Vessel Operating Costs

Crude Petroleum Imports
Transportation Savings by Channel Depth 2010-2060

	43	44	45	48	50
2010	$11,400	$16,988	$21,144	$30,106	$43,957
2020	$14,785	$21,763	$27,015	$38,505	$55,197
2030	$19,252	$26,589	$32,932	$52,612	$65,512
2040	$21,266	$29,371	$36,378	$58,117	$73,623
2050	$23,491	$32,444	$40,184	$64,197	$79,936
2060	$25,948	$35,838	$44,388	$70,914	$88,300
Crude Petroleum Average Annual Benefits (50-Year Period of Analysis)					
	$16,633	$23,713	$29,415	$44,581	$59,610

Petroleum Product Import and Export Tonnage and Coastwise Tonnage
Transportation Savings by Channel Depth 2010-2060

	43	44	45	48	50
2010	$2,469	$2,982	$3,448	$4,661	$4,661
2020	$3,870	$4,523	$5,117	$6,663	$6,663
2030	$4,379	$5,115	$5,785	$7,528	$7,528
2040	$4,957	$5,788	$6,544	$8,509	$8,509
2050	$5,614	$6,552	$7,405	$9,623	$9,623
2060	$6,360	$7,420	$8,384	$10,889	$10,889
Petroleum Product Average Annual Benefits (50-Year Period of Analysis)					
	$3,966	$4,656	$5,284	$6,918	$6,918
Total Annual Benefits (50-Year Period of Analysis)					
	$20,598	$28,369	$34,699	$51,499	$66,528

Texas City Channel Deepening Project
General Reevaluation Report and
Environmental Assessment
October 2007

Appendix B
Real Estate Appendix

APPENDIX B

Real Estate Appendix

1. **General Background**: The Texas City Channel Deepening Project was authorized under Section 201 of the Water Resources Development Act (WRDA) of 1986, Public Law 99-622, dated 17 November 1986. The existing navigation project is a 40-foot deep, 400-foot wide channel, from the Texas City Turning Basin to the Houston Ship Channel. A 50-foot project was authorized under WRDA 1986, but was never constructed because the project sponsor, the city of Texas City was unable to secure funding to initiate plans and specifications in 1989. In recent years the size and draft of vessels using the Texas City Channel have increased to meet the competitive demand for more efficient movements of bulk commodities, in particular crude petroleum and petroleum products. In 2001, the City requested that channel be deepened to 45 feet to accommodate that demand. The City did not request deepening the channel to the authorized depth of 50 feet due to potential high project costs and environmental concerns.

2. **Project Location.** The project is located in Galveston County, Texas. The Texas City Channel is located on the upper Texas coast extending from the Galveston Bay mainland shoreline at Texas City, through the jettied Galveston Entrance Channel, to deep water in the Gulf of Mexico. Galveston Bay is the largest estuarine system on the Texas coast and provides access to the principal ports of Houston, Texas City and Galveston.

3. **Project Description.** The Texas City Channel begins at Bolivar Road / Houston Ship Channel and continues to the Texas City Turning Basin, 6.7 miles. The Recommended Plan proposes to deepen the channel to 45 feet and widen in incidental areas. It also proposes to construct several beneficial use sites using dredged material. PAs 2A, 2B and 2C are located along the north flank of the Texas City Dike. The material dredged from the channel will be distributed into the surf to nourish the beach in this area. PAs 5 and 6 are two cells located on the existing Shoal Point PA. The Shoal Point PAs (SPPA) are available by virtue of Navigation Servitude. PAs SPPA 1 thru 5 will utilize dredged material beneficially are intended to create intertidal marsh habitat. These sites are all adjacent to Shoal Point in navigable waters (Plate 1).

4. **Real Estate Requirements.** The Texas City Channel will be dredged to a depth of 45 feet; new work dredging will take place from the Texas City Turning Basin to the Houston Ship Channel. All of the proposed dredging will be performed within navigable waters. All of the proposed PAs identified for this project are all subject to the Government's use of Navigation Servitude, a right that stems from the Commerce Clause of the Constitution which gives the

Government the right to use navigable waters in aid of navigation without compensation. Therefore, no real estate interests will be required. The controlling agency is the U.S. Army Corps of Engineers.

5. **Borrow Material.** There are no real estate needs for borrow material because borrow material would be obtained from channel construction and maintenance and from disposal areas.

6. **Access/Staging Area.** The Recommended Plan does not require any Access/Staging Areas. All of the proposed work will be performed within the existing right-of-way of the Texas City Channel. There is an existing public road to the Shoal Point PA and all other PAs are accessible by water only.

7. **Recreation Features.** There are no recreation features for the Recommended Plan.

8. **Induced Flooding.** There will be no induced flooding by virtue of the construction of the project. The proposed deepening and incidental widening of the channel will be constructed within navigable waters, in the existing channel.

9. **Mitigation.** The recommended plan contains no mitigation features. Dredged material excavated from the proposed project channel will be used beneficially to create 5 marsh sites. Navigation Servitude will be invoked since construction of these sites all fall within navigable waters of the US.

10. **Federally Owned Land & Existing Federal Project.** There are no federally owned lands within the Recommended Plan, however, the existing Texas City Channel is a Federally authorized 40-foot project which was completed in June 1967.

11. **Project Sponsor Owned Land.** The City of Texas City, sponsor for the project has approximately 350 acres they own in fee on Shoal Point PA.

12. **Navigation Servitude.** The entire project falls within the Navigable waters of the United States, therefore, no real estate acquisition or credits will be required.

13. **Public Law 91-646 Relocations.** There are no residential houses, businesses, or farms that would be required for relocation associated with PL 91-646.

14. **Assessment of Project Sponsor Land Acquisition Capabilities.** The local sponsor, the City of Texas City, has the authority and capability to furnish lands, easements and rights of way required by the Project Cooperation Agreement (PCA).

15. Baseline Cost Estimate for Real Estate. The Real Estate cost estimate reflects the estimated Federal cost for the project. These costs include team meetings, mapping of project, data maintenance, supervision and administrative costs. The real estate costs for the proposed project is $22,000.00.

16. Acquisition Schedule. There is no acquisition plan because the entire Recommended Plan falls within existing Rights-Of-Ways and PAs that are available by virtue of Navigation Servitude.

17. Mineral Activity. There are no active petroleum wells in the project alignment and PAs.

18. Facilities/Utilities Relocations. This is a Section 10 permitted facility and removals are not part of LERRD and not part of the local sponsor responsibility. There are no known facilities or utilities to be relocated within the project area. Three pipelines exist under the proposed project. One is an abandoned line scheduled to be removed by others prior to the start of construction and the other lines are at a substantial depth that the project dredging will not affect the pipes.

19. HTRW or Other Environmental Contaminants. There are no known hazardous or toxic wastes or other environmental contaminants on or within the project work area.

20. Attitudes of the Landowner. The City of Texas City and the U.S. Government are owners of the majority of the project lands. As owners they are supportive and in favor of the project. No resistance to the project by the landowners is expected.

Appendix C
Evaluation of Section 404 (b)(1) Guidelines

EVALUATION OF SECTION 404(b)(1) GUIDELINES
(SHORT FORM)

PROPOSED PROJECT: Texas City Channel Deepening Project, Galveston County, Texas

	Yes	No*
1. Review of Compliance (230.10(a)-(d))		
A review of the proposed project indicates that:		
a. The placement represents the least environmentally damaging practicable alternative and, if in a special aquatic site, the activity associated with the placement must have direct access or proximity to, or be located in the aquatic ecosystem, to fulfill its basic purpose (if no, see section 2 and information gathered for EA alternative).	X	
b. The activity does not appear to:		
1) Violate applicable state water quality standards or effluent standards prohibited under Section 307 of the Clean Water Act;	X	
2) Jeopardize the existence of Federally listed endangered or threatened species or their habitat; and	X	
3) Violate requirements of any Federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies).	X	
c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, an economic values (if no, see values, Section 2)	X	
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see Section 5)	X	

	Not Applicable	Not Significant	Significant*
2. Technical Evaluation Factors (Subparts C-F) (where a 'Significant' category is checked, add explanation below.)			
a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)			
1) Substrate impacts		X	
2) Suspended particulates/turbidity impacts		X	
3) Water column impacts		X	
4) Alteration of current patterns and water circulation		X	
5) Alteration of normal water fluctuation/hydroperiod	X		
6) Alteration of salinity gradients		X	
b. Biological Characteristics of the Aquatic Ecosystem (Subpart D)			
1) Effect on threatened/endangered species and their habitat		X	
2) Effect on the aquatic food web		X	
3) Effect on other wildlife (mammals, birds, reptiles and amphibians)		X	

	Not Applicable	Not Significant	Significant*
2. Technical Evaluation Factors (Subparts C-F) (where a 'Significant' category is checked, add explanation below.)			
c. Special Aquatic Sites (Subpart E)			
1) Sanctuaries and refuges	X		
2) Wetlands	X		
3) Mud flats	X		
4) Vegetated shallows	X		
5) Coral reefs	X		
6) Riffle and pool complexes	X		
d. Human Use Characteristics (Subpart F)			
1) Effects on municipal and private water supplies	X		
2) Recreational and Commercial fisheries impacts		X	
3) Effects on water-related recreation		X	
4) Aesthetic impacts		X	
5) Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves	X		

	Yes
3. Evaluation of Dredged or Fill Material (Subpart G)	
a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material (check only those appropriate)	
1) Physical characteristics	X
2) Hydrography in relation to known or anticipated sources of contaminants	X
3) Results from previous testing of the material or similar material in the vicinity of the project	X
4) Known, significant sources of persistent pesticides from land runoff or percolation	
5) Spill records for petroleum products or designated (Section 311 of Clean Water Act) hazardous substances	X
6) Other public records of significant introduction of contaminants from industries, municipalities or other sources	X
7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	X

List appropriate references:

1) U.S. Army Corps of Engineers Final Environmental Impact Statement for Texas City's Proposed Shoal Point Container Terminal Project, November 2002

	Yes	No
b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredged or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and placement sites and not likely to degrade the placement sites, or the material meets the testing exclusion criteria.	X	

	Yes
4. Placement Site Delineation (230.11(f))	
a. The following factors as appropriate, have been considered in evaluating the placement site:	
1) Depth of water at placement site	X
2) Current velocity, direction, and variability at placement site	X
3) Degree of turbulence	X
4) Water column stratification	X
5) Discharge vessel speed and direction	NA
6) Rate of discharge	X
7) Fill material characteristics (constituents, amount, and type of material, settling velocities)	X
8) Number of discharges per unit of time	NA
9) Other factors affecting rates and patterns of mixing (specify)	X

List appropriate references:

	Yes	No
b. An evaluation of the appropriate factors in 4a above indicates that the placement site and/or size of mixing zone are acceptable.	X	

	Yes	No
5. Actions to Minimize Adverse Effects (Subpart H)		
All appropriate and practicable steps have been taken, through application of recommendations of 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.	X	

List actions taken:

1) Control the pumping rate of the dredge and discharge to minimize loss of material.

	Yes	No*
6. Factual Determination (230.11)		
A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short- or long-term environmental effects of the proposed discharge as related to:		
a. Physical substrate at the placement site (review Sections 2a. 3, 4, and 5 above)	X	
b. Water circulation, fluctuation and salinity (review Sections 2a. 3, 4, and 5)	X	
c. Suspended particulates/turbidity (review Sections 2a. 3, 4, and 5)	X	
d. Contaminant availability (review Sections 2a. 3, and 4)	X	
e. Aquatic ecosystem structure and function (review Sections 2b and c, 3, and 5)	X	
f. Placement site (review Sections 2, 4, and 5)	X	
g. Cumulative impacts on the aquatic ecosystem	X	
h. Secondary impacts on the aquatic ecosystem	X	

7. Evaluation Responsibility	
a. This evaluation was prepared by:	**Kristy Morten**
Position:	**Environmental Specialist**

8. Findings	**Yes**
a. The proposed placement site for discharge of or fill material complies with the Section 404(b)(1) Guidelines.	X
b. The proposed placement site for discharge of dredged or fill material complies with the Section 404(b)(1) Guidelines with the inclusion of the following conditions:	

List of conditions:

c. The proposed placement site for discharge of dredged or fill material does not comply with the Section 404(b)(1) Guidelines for the following reason(s):	
1) There is a less damaging practicable alternative	
2) The proposed discharge will result in significant degradation of the aquatic ecosystem	
3) The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem	

6/6/2007 Date	Carolyn Murphy CAROLYN MURPHY Chief, Environmental Section

NOTES:

* A negative, significant, or unknown response indicates that the permit application may not be in compliance with the Section 404(b)(1) Guidelines.

Negative responses to three or more of the compliance criteria at the preliminary stage indicate that the proposed projects may not be evaluated using this "short form" procedure. Care should be used in assessing pertinent portions of the technical information of items 2a-e before completing the final review of compliance.

Negative response to one of the compliance criteria at the final stage indicates that the proposed project does not comply with the Guidelines. If the economics of navigation and anchorage of Section 404(b)(2) are to be evaluated in the decision-making process, the "short form" evaluation process is inappropriate.

Texas City Channel Deepening Project
General Reevaluation Report and
Environmental Assessment
October 2007

Appendix D
Air Conformity Analysis

- Texas City Channel Deepening Project General Air Conformity Determination Prepared by: Berger/EA – JV February 2007
- February 28, 2007 Correspondence to TCEQ
- Notice of Availability for General Conformity Determination
- Galveston Daily News Notice of Availability and Affidavit of Publication
- Houston Chronicle Notice of Availability and Affidavit of Publication
- TCEQ Air Conformity Air Certification

Texas City Channel Deepening Project

Formal General Conformity Determination

Prepared for:
The United States Army Corps of Engineers
P.O. Box 1229
Galveston, TX 77553-1229

Prepared by:

Berger/EA - JV
2300 N Street NW
Washington, DC 20037

Berger/EA
A Joint Venture

February 2007

USACE – GALVESTION DISTRICT, TEXAS CITY CHANNEL DEEPENING PROJECT
CLEAN AIR ACT DRAFT GENERAL CONFORMITY DETERMINATION

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LIST OF ABREVIATIONS

CAA .... Clean Air Act
CFR .... Code of Federal Regulations
CO .... Carbon Monoxide
GCR .... General Conformity Rule
HC .... Hydrocarbons
HP .... Horsepower
mmBtu .... Million British Thermal Units
NAAQS .... National Ambient Air Quality Standards
NO_X .... Oxides of Nitrogen
NSR .... Non-Attainment New Source Review
O_3 .... Ozone
Pb .... Airborne Lead
PM .... Particulate Matter
$PM_{2.5}$ .... Particulate Matter with an Equivalent Aerodynamic Diameter Less Than 2.5 um
PM_{10} .... Particulate Matter with an Equivalent Aerodynamic Diameter Less Than 10 um
PSD .... Prevention of Significant Deterioration
PX .... Post Exchange
SIP .... State Implementation Plan
SO_2 .... Sulfur Dioxide
TPY .... Tons Per Year
USEPA .... United States Environmental Protection Agency
TCEQ .... Texas Commission on Environmental Quality
VOC .... Volatile Organic Compounds

LIST OF DEFINITIONS

AP-42:
AP 42 is a compilation of air pollution emission factors and background information prepared by the EPA for various emission sources. These documents include a literature review, emissions factor methodologies and reference materials. An emissions factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant (e.g., kilograms of particulate emitted per megagram of coal burned). Such factors facilitate estimation of emissions from various sources of air pollution.
Clean Air Act (CAA):
The Clean Air Act is the comprehensive Federal law that regulates air emissions from area, stationary, and mobile sources. This law authorizes the U.S. Environmental Protection Agency to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment.
Criteria Air Pollutant:
A criteria pollutant is a pollutant for which an air quality standard has been established under the Clean Air Act (CAA). Under the requirements of the Clean Air Act and its amendments, USEPA established standards, known as the National Ambient Air Quality Standards (NAAQS), for six (6) criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), inhalable particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb).
***De Minimis* Emission Levels:**
Threshold rates of emissions which have been established for federal actions with the potential to have significant air quality impacts. A formal conformity determination is required when the annual direct and indirect emissions from a federal action, occurring in a non-attainment or maintenance area, equals or exceeds the *de minimis* level.
Federal Action:
Federal action", as defined in 30 TAC 101.30 of the Texas Administrative Code (TAC), means any activity engaged in by a department, agency, or instrumentality of the federal government, or any activity that a department, agency, or instrumentality of the federal government supports in any way; provides financial assistance for; licenses, permits, or approves. Activities related to transportation plans, programs, and projects developed, funded, or approved under Title 23 USC or the Federal Transit Act (49 USC §§1601 et seq.) are not considered to be federal actions under general conformity. Where the federal action is a permit, license, or other approval for some aspect of a nonfederal undertaking, the relevant activity is the part, portion, or phase of the nonfederal undertaking that required the federal permit, license, or approval.
General Conformity:
Section 176(c) of the Clean Air Act prohibits Federal entities from taking actions in non-attainment or maintenance areas which do not conform to the State implementation plan (SIP) for the attainment and maintenance of the national ambient air quality standards (NAAQS). Therefore, the purpose of conformity is to (1) ensure Federal activities do not interfere with the budgets in the SIPs; (2) ensure actions do not cause or contribute to new violations, and (3) ensure attainment and maintenance of the NAAQS
National Ambient Air Quality Standards (NAAQS):

The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. ***Primary standards*** set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. ***Secondary standards*** set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. The EPA Office of Air Quality Planning and Standards (OAQPS) has set National Ambient Air Quality Standards for six principal pollutants, which are called "criteria" pollutants.

Non-Attainment Area:

A non-attainment area is any area that does not meet the federal air quality standard because of exceedances of any of the National Ambient Air Quality Standards for the six criteria pollutants.

EPA NONROAD Model:

EPA model which establishes emission factors for off road mobile sources. It's primary use is for estimation of air pollution inventories by professional mobile source modelers, such as state air quality officials and consultants.

Ozone:

Ozone is a gas composed of three atoms of oxygen. Ozone occurs both in the Earth's upper atmosphere and at ground level. Ozone can be good or bad, depending on where it is found. In the Earth's lower atmosphere, near ground level, ozone is formed when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight. Ozone at ground level is a harmful air pollutant. Ground-level ozone is formed when ozone precursors react in the atmosphere in the presence of sunlight. Various adverse health affects are associated with elevated ozone levels in the lower atmosphere including respiratory and lung irritation/disease.

Ozone Precursors:

NO_X and VOCs are called ozone precursors. Motor vehicle exhaust, industrial emissions, and chemical solvents are the major sources of these chemicals. Nitrogen oxides (NO_X) and volatile organic compounds (VOCs), such as xylene, react in the atmosphere in the presence of sunlight to form Ozone.

State Implementation Plan (SIP):

The federal Clean Air Act addresses the nation's chronic air pollution problems by requiring states to submit State Implementation Plans (SIPs) to the U.S. Environmental Protection Agency. These plans detail the steps that the states are taking to bring their air quality into compliance with federal standards. In certain cases, the Clean Air Act requires specific air pollution control programs. The State Implementation Plan is essentially each individual state's plan for complying with the federal Clean Air Act.

SECTION 1 INTRODUCTION

The United States Army Corps of Engineers has retained the services of the Berger/EA-JV to perform a general conformity analysis with respect to the Texas City Channel Deepening project in Galveston County, Texas. In support of the environmental assessment for this project, the JV prepared a conformity analysis for the proposed project pursuant to the Clean Air Act 176(c)(1), to assess emissions from the project and to demonstrate conformance with the Texas State Implementation Plan (SIP) for the Houston-Galveston-Brazoria Area. The objective of the conformity analysis is to insure that the proposed action will not violate the emissions allowance of the SIP, USEPA and Texas air quality standards.

1.1 Description of Project

The Texas City Channel is a Federal deep-draft navigation project serving the port of Texas City in Galveston County, Texas. The existing project consists of a channel 40 feet deep, 400 feet wide and about 6.75 miles long, from Bolivar Roads to a turning basin at Texas City, 40 feet deep, 1,000 feet to 1,200 feet wide and 4,253 feet long; and an Industrial Canal, 40 feet deep and 300-400 feet wide extending a distance of 1.7 miles southwestward from the south end of Texas City Turning Basin, and a turning basin, 40 feet deep, 1,000 feet wide and 1,150 feet long. The Texas City Channel is protected from cross currents and shoaling by the Texas City Dike, which consists of a pile dike 28,200 feet long, parallel to and north of the channel; and a rubble-mound dike, 27,600 feet long, along the southerly side of the pile dike. The 40-foot channel was completed in June 1967. Widening and realigning of the Texas City Turning Basin and enlargement through widening and deepening of the Industrial Canal and basins was initiated in July 1980 and completed in June 1982. The only work remaining is deferred construction consisting of widening the Industrial Canal from 250 feet to 300 feet at 40 feet depth.

Section 201 of the Water Resources Development Act (WRDA) of 1986, Public Law 99-662, dated 17 November 1986, authorized the Texas City Channel 50-Foot project. Work authorized by WRDA 1986 provided for deepening the Texas City Turning Basin to 50 feet, enlarging the 6.7-mile long Texas City Channel to 50 feet by 600 feet, deepening the Bolivar Roads Channel and Inner Bar Channel to 50 feet, deepening the Outer Bar and Galveston Entrance Channels to 52 feet, and extending the Galveston Entrance Channel to a 52-foot depth for 4.1 miles at a width of 800 feet and a additional reach at a width of 600 feet to the 52- foot contour in the Gulf of Mexico. Establishment of 600 acres of wetland and development of water-oriented recreational facilities on a 90-acre enlargement of the Texas City Dike were also authorized.

The current Recommended Plan calls for deepening the Texas City Channel to a depth of 45-feet and maintaining the existing 400-feet bottom width for approximately 7 miles of channel including the turning basin (see attachment regarding construction quantity, equipment and schedule information). For the purposes of this analysis, the project has been divided into three phases based upon contracts: 1) Pelican Island Levee Construction, 2) Rock Groin Construction, and 3) Levees 2, 3, 4 and 5. No overlap of the three (3) contracts is anticipated. For the purposed of this analysis, the proposed action is defined as construction activities related to the Texas City Channel expansion.

1.2 Clean Air Conformity

The 1990 amendments to the Clean Air Act (CAA) require federal agencies to conform to SIPs in non-attainment areas (such as the Houston-Galveston-Brazoria Area). SIPs are state air quality regulations that provide for the implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS) and include emission limitations and control measures to attain and maintain the NAAQS. Federal agencies are required to determine if proposed actions conform to the applicable SIP.

The US Environmental Protection Agency (USEPA) has developed two conformity regulations for transportation and non-transportation projects. Transportation projects are governed by the "transportation conformity" regulations (40 CFR Parts 51 and 93). Non-transportation projects are governed by the "general conformity" regulations (40 CFR Parts 6, 51 and 93) described in the final rule for *Determining Conformity of General Federal Actions to State or Federal Implementation Plans.* Since the proposed project is a non-transportation project, only the general conformity rule applies.

1.3 Outline

Section 2 of the report contains a discussion of the conformity regulations and how they apply to the project. Section 3 describes the analysis used to make the conformity determination. Section 4 presents the conclusion of the analysis.

SECTION 2 GENERAL CONFORMITY

2.1 Attainment and Non-attainment Areas

The General Conformity Rule applies to federal actions occurring in regions designated as being in non-attainment for the NAAQS or attainment areas subject to maintenance plans (maintenance areas). A criteria pollutant is a pollutant for which an air quality standard has been established under the CAA. Under the requirements of the Clean Air Act (CAA) and its amendments, USEPA established standards, known as the NAAQS, for six (6) criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), inhalable particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb).

Non-attainment designation is based on the exceedances or violations of the air quality standard established for a criteria air pollutant. A maintenance plan establishes measures to control emissions so as to ensure that the air quality standard is maintained in areas that have been redesignated as attainment from a previous non-attainment status. The proposed action would take place in the Houston-Galveston-Brazoria Area (HGA), Galveston County, TX, which is located in an area currently designated as moderate non-attainment for O_3 and in attainment for the other criteria pollutants. O_3 is principally formed through chemical reactions of NO_x and VOC in the atmosphere therefore, only emissions of NO_x and VOC are included in the analysis. No maintenance areas are located in the vicinity of the project.

2.2 *De Minimis* Emission Levels

Threshold *(de minimis)* rates of emissions have been established for federal actions with the potential to have significant air quality impacts. Based upon the preliminary air conformity analysis completed December 1, 2005 by Berger, it was determined that construction of the proposed plan and schedule would generate air emissions above *de minimis* levels specified in 40 CFR 93.153(b)(1) for non-attainment areas 40 CFR 93.153(c)(1). Per the provisions of 40 CFR 93.150, a formal conformity determination is required when the annual direct and indirect emissions from a federal action, occurring in a non-attainment or maintenance area, equals or exceeds the *de minimis* level. Table 2-2 lists the *de minimis* levels by pollutant, while Table 2-3 lists ozone attainment classification and *de minimis* levels for specific counties/areas in Texas as provided by the Texas Commission on Environmental Quality (TCEQ). Since the project is located in a moderate O_3 non-attainment area, only the 100 tons per year of VOC or NO_x threshold applies.

2.3 Regional Significance

A federal action that does not exceed the threshold emission rates of criteria pollutants may still be subject to a general conformity determination if the direct and indirect emissions from the action exceed ten percent of the total emissions inventory for a particular criteria pollutant in a non-attainment or maintenance area. If the emissions exceed this ten-percent threshold, the federal action is considered to be a "regionally significant" activity, and thus, the general conformity rules apply.

2.4 SIP Emissions Inventory

The NO_X emission inventory is based on the combined 2004 Statewide Diesel Construction NonRoad Mobile Emissions for the eight counties which make up the Houston-Galveston-Brazoria Area. This inventory was provided by Karla Hardison of the TCEQ Mobile Source Monitoring Department and was taken from the 2004 HGB SIP. The 2004 NO_X emission inventory for the HGB area is 10,338.70 tons. As per TCEQ guidance a 2.5 % annual growth rate can be applied to estimate specific years of interest as a general default. As discussed in the previous section, if emissions from the project are below ten percent of the emission inventory for that year then the project is not considered to be "regionally significant". Table 2-1 details total NO_X emissions by calendar year for the duration of the project and compares these emissions to the adjusted NO_X NonRoad Mobile Source Emission Inventory.

Table 2-1
Summary Total NO_X Emissions

Year	Total Emissions (tons/year)	HGB NO_X Emission Inventory (tons/year)	% of Inventory
	NO_X		
2008	420.95	11,411.99	3.69
2009	123.01	11,697.29	1.05
2010	1,176.06	11,989.72	9.81
2011	438.60	12,289.46	3.57
2012	87.33	12,596.70	0.69

* 2.5% annual growth rate applied to NO_X emissions inventory for each year as per Karla Hardison of the TCEQ Mobile Source Monitoring Department.

Table 2-2
***De Minimis* Emission Levels for Applicable Air Pollutants**

Pollutant	Non-attainment Designation	TPY
Ozone	Serious	50
	Severe	25
	Extreme	10
	Other non-attainment areas outside ozone transport region	100*
	Marginal and Moderate non-attainment areas inside ozone transport region (VOC / NOx)	50/100**
Carbon Monoxide	All	100
Sulfur Dioxide	All	100
Lead	All	25
Nitrogen Dioxide	All	100
Particulate Matter	Moderate	100
	Serious	70

Notes:
* Applies to ozone precursors – volatile organic compounds (VOC) and nitrogen oxides.(NO_x)
** VOC/NO_x
*** Galveston County has a non-attainment designation of moderate for Ozone

Table 2-3
Attainment Classification/*De Minimis* Emission Levels for Texas

Area	Classification	VOC tpy	NOx tpy
Houston-Galveston-Brazoria (8-county area)	Moderate ozone non-attainment	100	100
Beaumont–Port Arthur (3-county area)	Moderate ozone non-attainment	100	100
Dallas–Fort Worth (9-county area)	Moderate ozone non-attainment	100	100

SECTION 3 ANALYSIS

The conformity analysis examines the impacts of the net direct and indirect emissions resulting from the project. Direct emissions are emissions of a criteria pollutant or its precursors that are caused or initiated by a federal action and occur at the same time and place as the action. Indirect emissions, occurring later in time and/or further removed in distance from the action itself, must be included in the determination if both of the following apply; the federal agency can practicably control the emissions and has continuing program responsibility to maintain control and the emissions caused by the federal action are reasonably foreseeable. In the case of this action, there are not expected to be any associated indirect emissions and only direct emissions are considered.

3.1 Activities Included in this Action

Assumptions and equipment schedules were based on those provided by the Galveston District. The project was assumed to take place during the period from 2008 to 2012. A list of equipment and their assumed operating schedule was provided by ACOE on a per contract basis. The majority of construction activities will be marine based and a very small group of people (approximately 25) will actually commute to and from the site on a daily basis. As such, traffic emissions do not need to be included since there is a negligible increase in passenger trips for the project. A summary of the emission estimates for operational sources is presented in Table 3-1. Detailed emission calculations for these sources are presented in Appendix A. Emissions have been broken down by land based and marine based equipment and then further categorized by calendar year.

Since the action refers to construction projects, only construction activities-related air emissions were analyzed. VOC and NO_X emissions from construction would result from the following potential activities:

- Use of construction equipment.
- Use of amphibious dredging equipment.

In estimating NO_x and VOC emissions, dredging was assumed to take place 24 hours a day / 7 days a week while other construction activities were assumed to take place 8 hours a day / 5 days a week. The usage of equipment and the duration of activities for construction were determined based on information provided by the Galveston District. The increase in emissions was then calculated using the USEPA provided guidance and emission factors.

3.2 Emissions Determination

Emission factors for the dredges were obtained from the USEPA, Office of Mobile Sources "Technical Highlights, Emission Factors for Locomotives" report dated December 1997. 2000 Fleet Average Emission Factors for All Locomotives were used in order to be representative of an engine that would be typically used in a dredge suitable for the Texas City Project. That assumption is based on a review of information available from potential bidders. Tier 0 standards apply to these factors due to the age of the engines used in a typical dredge. Emission factors for the 30" booster pumps were obtained using USEPA AP-42 factors for diesel engines. Emission factors for other construction equipment typical of this type of project were obtained using the USEPA NONROAD Emission Factors for 2005 inventory file and the USEPA guidance document AP-42. This file provides emission factors and other information from the draft NONROAD2004 model for the 2005 calendar year and was suggested for use in estimating of emissions from non-road construction equipment by the USEPA. Tier 2/3 level emission factors were used only for land based equipment, which account for a small minority of the emissions associated with this project. It is assumed that contractors will rent land-based/construction equipment and thus these factors are considered to be representative of the equipment to be used. All other factors used were consistent with Tier 0 level. Additionally, information was used from the USEPA regulatory document "Final Regulatory Impact Analysis: Control of Emissions from Marine Diesel Engines" along with guidance directly from USEPA personnel. This document was suggested by the USEPA for use in estimating of emissions from marine engines.

The General Conformity Rule requires that potential emissions generated by any project-related demolition or construction activity and/or increased operational activities be determined on an annual basis and compared to the annual *de minimis* levels for those pollutants (or their precursors) for which the area is classified as non-attainment or maintenance. Emissions attributable to operational activities and construction were analyzed for NO_X and VOC.

In estimating operational-related dredging, 2000 Fleet Average Emission Factors for All Locomotives obtained from the USEPA, Office of Mobile Sources "Technical Highlights, Emission Factors for Locomotives" report dated December 1997 were used. In estimating operational-related tug, booster pump, track hoe, dragline, dozer and other equipment emissions, the USEPA AP-42 emission factors or NONROAD Emission Factors were used if other emissions information was not provided. Emissions from the operation of the equipment are assumed to be released during the dredging activities over the duration of the project on a per contract basis. Total emissions were calculated for each contract and then each calendar year from 2008 to 2012. Depending on contract duration, emissions may occur in one calendar year only or several. The majority of emissions are expected to occur during 2008 and 2010 when the dredging cycles for Contract 1 and Contract 3 are expected to occur. Table 3-1 provides total emissions per calendar year for the project duration (2008 to 2012) along with additionally separating emissions for each year by equipment type (i.e. land or marine based). Table 3-1 also compares project emissions with the combined 2004 Statewide Diesel Construction NonRoad Mobile Emission budget provided by Karla Hardison of the TCEQ Mobile Source Monitoring Department and taken from the 2004 HGB SIP. Emissions from each year are less than 10% of the budget.

In estimating construction-related NO_X and VOC emissions, the usage of equipment, the likely duration of each activity, and manpower estimates for each activity for the construction were determined based on information provided by the Galveston District and the past field experience for similar types of dredging projects. For the proposed dredging project, equipment operating parameters (engine horsepower and operating hours) were based upon conservative estimates provided by the Galveston District. All equipment was assumed to be diesel-powered unless otherwise noted. Pieces of equipment to be used for the dredging include, but are not limited to; dozers, amphibious backhoes, dredges engines and dredge booster pumps.

Estimates of construction equipment emissions were based on the estimated hours of usage and emission factors for each source. Emission factors in grams of pollutant per hour per horsepower were multiplied by the estimated running time and equipment associated average horsepower provided by the USEPA to calculate total grams of pollutant from each piece of equipment. Finally, these total grams of pollutant were converted to tons of pollutant.

The USEPA recommends the following formula to calculate hourly emissions from nonroad engine sources:

$M_i = N \times HP \times LF \times EF_i$

Where:
M_i = mass of emissions of pollutants.
N = source population (units).
HP = average rated horsepower.
LF = typical load factor.
EF_i = average emissions of pollutant per unit of use (e.g., grams per horsepower-hour).

It should be noted that the dredging and construction activities associated with the Texas City Channel project were previously accounted for in the Final General Conformity Determination for Texas City's Proposed Shoal Point Container Terminal, November 2002 (U.S. Army Corps of Engineers, Galveston District, Final Environmental Impact Statement for Texas City's Proposed Shoal Point Container Terminal, Volume II, Appendix H-9, November 2002). This project included construction of an access road, a wharf, container yard and dredging of the channel, berthing areas, and turning basin. Emissions associated with dredging and related construction activities were assumed to occur in Phase II of the project (2006 and 2007).

The conformity determination for the Shoal Point Container Terminal project was previously approved. "By letter dated September 9, 2002, the TNRCC provided a Conditional General Conformity Certification for the proposed project stating that construction emissions are accounted for in the applicable SIP based on information provided to date." Therefore, these emissions were already accounted for and should not be included in the Texas City Channel emission calculations.

There are two main differences between the Shoal Point Container Terminal and Texas City Channel Dredging project. The Texas City Channel Dredging project includes only dredging and construction activities related to the deepening of the Texas City Channel while the Shoal Point Container Terminal project included these activities as well as additional construction activities associated with construction of an access road, wharf and container yard. Additionally, the Shoal Point Container Terminal project assumed use of electric powered dredges for the dredging portion of the project, while the Texas City Channel project is assuming use of diesel powered dredges. As such, dredging related emissions included in the Shoal Point Container Terminal Conformity Determination are significantly less than the calculations included in this report. NO_X emissions associated with dredging and dredging related activities which were included in the Shoal Point Container Terminal Conformity Determination were 46.2 tons during 2006 and 6.2 tons per year during 2007. VOC emissions associated with dredging and dredging related activities which were included in the Shoal Point Container Terminal Conformity Determination were 8.9 tons during 2006 and 0.9 tons per year during 2007. The emissions included in this report were reduced by these amounts during 2010 as the vast majority of emissions associated with the Texas City Channel project occurred during this year.

Based upon this analysis, only annual emissions of NO_X exceed the *de minimis* thresholds and only during 2008, 2009, 2010 and 2011. Complete details of emissions calculations used in the analysis are presented in Appendix A.

Table 3-1
Summary Total Emissions

Year	Marine Based Emissions (tons/year)		Land Based Emissions (tons/year)		Total Emissions (tons/year)		HGB NO_X Emission Inventory (tons/year)	% of Inventory
	VOC	NO_X	VOC	NO_X	VOC	NO_X		
2008	15.41	403.95	0.97	17.00	16.38	420.95	11,411.99	3.69
2009	5.02	114.61	0.48	8.41	5.50	123.01	11,697.29	1.05
2010	42.44	1,171.28	0.38	4.79	42.82	1,176.06	11,989.72	9.81
2011	19.06	437.00	0.13	1.60	19.19	438.60	12,289.46	3.57
2012	4.94	87.33	0.00	0.00	4.94	87.33	12,596.70	0.69

* 2.5% annual growth rate applied to NO_X emissions inventory for each year as per Karla Hardison of the TCEQ Mobile Source Monitoring Department.

SECTION 4 CONCLUSION

The Texas City Channel is a Federal deep-draft navigation project serving the port of Texas City in Galveston County, Texas. The Galveston District of the Army Corp of Engineers is proposing the deepening the Texas City Channel. The Proposed Project has been divided into three phases based upon contracts: 1) Pelican Island Levee Construction, 2) Rock Groin Construction, and 3) Levees 2, 3, 4 and 5. No overlap of the three (3) contracts is anticipated.

Under the general conformity rule, emissions resulting from a proposed federal action must be compared to the applicable *de minimis* levels on an annual basis. As shown in this analysis, the emission values for the proposed action exceed the *de minimis* criteria of 100 TPY for NO_X during the years of 2008 through 2011, therefore a formal conformity determination was prepared. The formal analysis included a comprehensive emissions determination which detailed emissions based on contract, year and equipment type. This formal analysis determined that the project will be in conformity with the HGB SIP based upon the following:

- Emissions for each year are less than the designated emission inventory presented in the SIP.
- Emissions from the action for each year are below ten percent of the total construction emissions inventory for both NO_X and VOC's based on the 2004 SIP for the Houston-Galveston-Brazoria Area.

As a result, this project is not considered to be a "regionally significant" activity, and thus the project construction emissions conform to the SIP.

APPENDIX A

DETAILED EMISSION CALCULATIONS

Texas City Channel 45-Foot Deepening Project Construction Activities

Marine Based Emissions								
				Emission Factor (g/hp-hr)		Emissions (tons)		
Type	Activity	Hours of Operation	Horse power (HP)	VOC	NO_X	VOC	NO_X	% of Total Emissions
CONTRACT 1: PELICAN ISLAND LEVEE CONSTRUCTION								
Dredging Cycle (Duration = 3 months)								
30" Dredge	Dredging	1500	9000	0.52	13.16	7.73	195.66	11.19%
	Idle	675	3000	0.52	13.16	1.16	29.35	1.68%
30" Booster Pump	Dredging	1500	7500	0.32	10.89	3.96	134.93	7.72%
	Idle			0.32	10.89	0.00	0.00	0.00%
Dredging Tugs (3 @ 500hp each)	Dredging	1500	1500	0.3	5.3	0.74	13.13	0.75%
Spill Barge	Construction	300	165	0.42	6.05	0.02	0.33	0.02%
Dragline	Dredging	450	165	0.42	6.05	0.03	0.49	0.03%
Amphibious Track Hoe	Construction	132	290	1.71	7.59	0.07	0.32	0.02%
Crewboat	Construction	270	400	0.3	5.3	0.04	0.63	0.04%
Rock Placement (Duration 4 months, 4 month delay)								
Crewboat	Construction	360	400	0.3	5.3	0.05	0.84	0.05%
Dragline (4600 Manitowoc	Construction	1200	680			0.00	0.00	0.00%
Outboard Skiff	Construction	480	90	0.3	5.3	0.01	0.25	0.01%
River Tug	Construction	480	4000	0.3	5.3	0.63	11.21	0.64%
	Idle	2400	1200	0.3	5.3	0.95	16.81	0.96%
					Contract Total	**15.41**	**403.95**	23.11%
CONTRACT 2: ROCK GROIN CONSTRUCTION								
Dredging Cycle (Duration = 6 months)								
24" Dredge	Dredging	1500	3400	0.52	13.16	2.92	73.92	4.23%
	Idle	675	1200	0.52	13.16	0.46	11.74	0.67%
Dredging Tugs (3 @ 500hp each)	Dredging	1500	1500	0.3	5.3	0.74	13.13	0.75%

Crewboat	Construction	540	400	0.3	5.3	0.07	1.26	0.07%
Rock Placement (Duration = 2 months, 4 month delay)								
Crewboat	Construction	180	400	0.3	5.3	0.02	0.42	0.02%
Dragline (4600 Manitowoc	Construction	600	680			0.00	0.00	0.00%
Outboard Skiff	Construction	240	90	0.3	5.3	0.01	0.13	0.01%
River Tug	Construction	240	4000	0.3	5.3	0.32	5.60	0.32%
	Idle	1200	1200	0.3	5.3	0.48	8.41	0.48%
					Contract Total	**5.02**	**114.61**	6.56%
CONTRACT 3: LEVEES 2, 3, 4 & 5 CONSTRUCTION								
Dredging Cycle (Duration = 16 months)								
30" Dredge	Dredging	8000	9000	0.52	13.16	41.23	1043.52	59.70%
	Idle	3600	3000	1	13.16	11.89	156.53	8.95%
30" Booster Pump	Dredging	4000	7500	0.32	10.89	10.57	359.80	20.58%
Dredging Tugs (3 @ 500hp each)	Dredging	6400	1500	0.3	5.3	3.17	56.04	3.21%
Spill Barge	Dredging	1600	165	0.42	6.05	0.12	1.76	0.10%
	Idle			0.42	6.05	0.00	0.00	0.00%
Dragline	Construction	2400	165	0.42	6.05	0.18	2.64	0.15%
Amphibious Track Hoe	Construction	4480	290	1.71	7.59	2.45	10.86	0.62%
Crewboat	Construction	180	400	0.3	5.3	0.02	0.42	0.02%
Rock Placement (Duration = 16 months, 4 Month Delay)								
Crewboat	Construction	1440	400	0.3	5.3	0.19	3.36	0.19%
Dragline (4600 Manitowoc	Construction	4800	680			0.00	0.00	0.00%
Outboard Skiff	Construction	1920	90	0.3	5.3	0.06	1.01	0.06%
River Tug	Construction	1920	4000	0.3	5.3	2.54	44.83	2.56%
	Idle	9600	1200	0.3	5.3	3.81	67.24	3.85%
					Contract Total	**76.24**	**1748.01**	100.00%
					Project Total	**96.67**	**2266.57**	
2008 Emissions (Contract 1 -Dredging Cycle and Rock Placement)						**15.41**	**403.95**	17.8%
2009 Emissions (Contract 2 -Dredging Cylce and Rock Placement)						**5.02**	**114.61**	5.1%
2010 Emissions (Contract 3 -1st 3 quarters of Dredging Cycle)						**52.24**	**1223.68**	54.0%
2011 Emissions (Contract 3 -last qtr of dredging cycle, delay, 1st qtr of rock placement)						**19.06**	**437.00**	19.3%
2012 Emissions (Contract 3-last 3 quarters of rock placement)						**4.94**	**87.33**	3.9%

Texas City Channel 45-Foot Deepening Project Construction Activities

Land Based Emissions								
				Emission Factor (g/hp-hr)		Emissions (tons)		
Type	Activity	Hours of Operation	Horse power (HP)	VOC	NO_X	VOC	NO_X	% of Total Emissions
CONTRACT 1: PELICAN ISLAND LEVEE CONSTRUCTION								
Dredging Cycle (Duration = 3 months)								
Wide Track Dozer	Construction	132	185	0.56	6.99	0.02	0.19	1.11%
Rock Placement (Duration 4 months, 4 month delay)								
Excavator (330 Cat) - 2	Construction	1200	220			0.00	0.00	0.00%
	Idle	2400	1200	0.3	5.3	0.95	16.81	98.89%
					Contract Total	**0.97**	**17.00**	100.00%
CONTRACT 2: ROCK GROIN CONSTRUCTION								
Dredging Cycle (Duration = 6 months)								
Rock Placement (Duration = 2 months, 4 month delay)								
Excavator (330 Cat) - 2	Construction	1200	220			0.00	0.00	0.00%
	Idle	1200	1200	0.3	5.3	0.48	8.41	100.00%
					Contract Total	**0.48**	**8.41**	100.00%
CONTRACT 3: LEVEES 2, 3, 4 & 5 CONSTRUCTION								
Dredging Cycle (Duration = 16 months)								
Wide Track Dozer	Construction	4480	185	0.56	6.99	0.51	6.38	100.00%
Rock Placement (Duration = 16 months, 4 Month Delay)								
Excavator (330 Cat) - 2	Construction	9600	220			0.00	0.00	0.00%
					Contract Total	**0.51**	**6.38**	100.00%
					Project Total	**1.95**	**31.78**	
2008 Emissions (Contract 1 -Dredging Cycle and Rock Placement)						**0.97**	**17.00**	53.5%
2009 Emissions (Contract 2 -Dredging Cylce and Rock Placement)						**0.48**	**8.41**	26.4%
2010 Emissions (Contract 3 -1st 3 quarters of Dredging Cycle)						**0.38**	**4.79**	15.1%
2011 Emissions (Contract 3 -last qtr of dredging cycle, delay, 1st qtr of rock placement)						**0.13**	**1.60**	5.0%
2012 Emissions (Contract 3-last 3 quarters of rock placement)						**0.00**	**0.00**	0.0%

Total Annual Emissions for All Equipment			
	(tons)		% of Total
	VOC	NO_X	Emissions
Total Emissions for 2008	16.38	420.95	18.3%
Total Emissions for 2009	5.50	123.01	5.4%
Total Emissions for 2010	42.82	1176.06	51.2%
Total Emissions for 2011	19.19	438.60	19.1%
Total Emissions for 2012	4.94	87.33	3.8%

* VOC and NOx emissions for 2010 were reduced by 9.8 tons and 52.4 tons respectively due to the fact that these emissions were previously accounted for based on the Shoal Point Terminal Conformity Determination.

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229
FEBRUARY 28, 2007

Environmental Section

Ms. Margie McAllister
Team Leader, Air Quality Planning Section
Texas Commission on Environmental Quality
MC206
P.O. Box 13087
Capitol Station Austin, Texas 78711-3087

Dear Ms. McAllister:

The Galveston District, Corps of Engineers requests your review of the enclosed Draft General Conformity Determination for the Federal Texas City Channel Deepening Project, Galveston County, Texas. We discussed this project with you and your staff in our meeting on December 1, 2006 in Austin. The proposed project consists of deepening the existing 40-foot channel to 45 feet from Shoal Point to the Houston Ship Channel in Galveston Bay. The proposed Federal project accomplishes the channel deepening portion of the City of Texas City's Shoal Point Container Terminal Project, which received Department of Army Permit Number 21979 in 2003 but which has not been constructed. The permitted Shoal Point Project includes a six-berth marine container terminal with wharves, berthing areas and a new turning basin at Shoal Point, and deepening the Texas City Channel to -45 feet MLT. The 2002 Environmental Impact Statement (EIS) for the Shoal Point Project demonstrated compliance with the Clean Air Act. The projected Shoal Point construction emissions were subsequently accounted for in the Houston-Galveston-Brazoria Area (HGBA) 2004 State Implementation Plan (SIP).

The enclosed Draft General Conformity Determination was prepared pursuant to the Clean Air Act, Section 176(c)(1), and 40 CFR Part 51, Subpart W to address minor additional construction impacts not accounted for in the Shoal Point EIS General Conformity Determination, including deepening the existing turning basin, minor bend easing of the main navigation channel, and construction of a new, 75-acre beach nourishment placement area on the north side of the Texas City Dike. Additional project information can be found in the Draft Environmental Assessment (EA) for the Federal Texas City Channel Deepening Project we recently coordinated with your office, which is also available on our website at http://www.swg.usace.army.mil/pe-p/TexasCityGRR/default.asp.

The enclosed Draft General Conformity Determination demonstrates that emissions for each year of construction are less than the designated emission inventory presented in the current SIP, and also that the emissions from the action for each year are below ten percent of the total construction emissions inventory for both NO_X and VOC's, based on the 2004 HGBA SIP. As a result, this project is not considered to be a regionally significant activity.

We request your review of the enclosed Draft General Conformity Determination and concurrence in our finding that the proposed Federal Texas City Channel Deepening Project conforms to the HGBA SIP. The report has been noticed for public comment and we will accept comments through April 2, 2007. The General Conformity Determination report and associated correspondence will be incorporated into the Final EA for the project.

MORTEN/mg/3195
CESWG-PE-PR
2/28/07

The report can also be downloaded from the Galveston District website at http://www.swg.usace.army.mil/pep/TexasCityGRR/Draft%20Texas%20City%20Channel%20Air%20Conformity%20Report%20Revised%202-26-07.pdf. Any questions concerning this request or the project should be directed to Ms. Kristy Morten at (409) 766-3195 or kristy.l.morten@swg02.usace.army.mil.

Sincerely,

Carolyn Murphy

Carolyn Murphy
Chief, Environmental Section

MURPHY
CESWG-PE-PR

CF w/ encl:

U.S. Environmental Protection Agency
Michael P. Jansky, P.E.
1445 Ross Ave. (6EN-XP)
Dallas, Texas 75202-2733

Houston-Galveston Area Council
Graciela Lubertino
P.O. Box 22777
3555 Timmons Lane, Suite 500
Houston, Texas 772277-2777

NOTICE OF AVAILABILITY

DRAFT GENERAL CONFORMITY DETERMINATION
TEXAS CITY CHANNEL DEEPENING PROJECT
GALVESTON COUNTY, TEXAS

The Galveston District, U.S. Army Corps of Engineers (USACE) has completed a Draft General Conformity Determination for the Federal Texas City Channel Deepening Project, a deep-draft navigation project serving the Port of Texas City in Galveston County, Texas. The project consists of deepening the exiting 40-foot channel to 45 feet from Shoal Point to the Houston Ship Channel in Galveston Bay. The proposed Federal project accomplishes the channel deepening portion of the City of Texas City's Shoal Point Container Terminal Project, which received a Department of Army permit in 2003 and which has not been constructed. The permitted Shoal Point Project includes a six-berth marine container terminal with wharves, berthing areas and a new turning basin at Shoal Point, and deepening the Texas City Channel to -45 feet MLT. The Environmental Impact Statement (EIS) for the Shoal Point Project included a General Conformity Determination which demonstrated that the project was compliant with the Clean Air Act. The projected Shoal Point construction emissions were subsequently accounted for in the Houston-Galveston-Brazoria (HGB) Area State Implementation Plan (SIP). The current Draft General Conformity Determination addresses minor additional construction impacts not accounted for in the Shoal Point EIS General Conformity Determination including deepening the existing turning basin, minor bend easing of the main navigation channel, and construction of a new, 75-acre beach nourishment placement area on the north side of the Texas City Dike.

The Federal Texas City Channel Deepening Project Draft General Conformity Determination was prepared pursuant to the Clean Air Act, Section 176(c)(1), and 40 CFR Part 51, Subpart W to assess whether the emission associated with the new project features conform with the HGB SIP. The analysis determined that emissions for each year of construction are less than the designated emission inventory presented in the 2004 emissions inventory for both NO_X and VOC's based on the 2004 SIP. As a result, this SIP, and that emissions for each year are below ten percent of the total construction project is not considered to be a regionally significant activity, and thus, the project construction emissions conform to the SIP.

The Draft General Conformity Determination can be downloaded from the USACE website at http://www.swg.usace.army.mil/. A hard copy of the report will also be made available upon request. Requests and comments should be submitted to Ms. Carolyn Murphy, Chief, Environmental Section (PE-PR), U.S. Army Corps of Engineers, 2000 Fort Point Road, Galveston, Texas 77553 (carolyn.e.murphy@swg02.usace.army.mil). Comments should be submitted by April 2, 2007.

NOTICE OF AVAILABILITY

DRAFT GENERAL CONFORMITY DETERMINATION TEXAS CITY CHANNEL DEEPENING PROJECT GALVESTON COUNTY, TEXAS

The Galveston District, U.S. Army Corps of Engineers (USACE) has completed a Draft General Conformity Determination for the Federal Texas City Channel Deepening Project, a deep-draft navigation project serving the Port of Texas City in Galveston County, Texas. The project consists of deepening the exiting 40-foot channel to 45 feet from Shoal Point to the Houston Ship Channel in Galveston Bay. The proposed Federal project accomplishes the channel deepening portion of the City of Texas City's Shoal Point Container Terminal Project, which received a Department of Army permit in 2003 and which has not been constructed. The permitted Shoal Point Project includes a six-berth marine container terminal with wharves, berthing areas and a new turning basin at Shoal Point, and deepening the Texas City Channel to -45 feet MLT. The Environmental Impact Statement (EIS) for the Shoal Point Project included a General Conformity Determination which demonstrated that the project was compliant with the Clean Air Act. The projected Shoal Point construction emissions were subsequently accounted for in the Houston-Galveston-Brazoria (HGB) Area State Implementation Plan (SIP). The current Draft General Conformity Determination addresses minor additional construction impacts not accounted for in the Shoal Point EIS General Conformity Determination including deepening the existing turning basin, minor bend easing of the main navigation channel, and construction of a new, 75-acre beach nourishment placement area on the north side of the Texas City Dike.

The Federal Texas City Channel Deepening Project Draft General Conformity Determination was prepared pursuant to the Clean Air Act, Section 176(c)(1), and 40 CFR Part 51, Subpart W to assess whether the emission associated with the new project features conform with the HGB SIP. The analysis determined that emissions for each year of construction are less than the designated emission inventory presented in the 2004 emissions inventory for both NOX and VOC's based on the 2004 SIP. As a result, this SIP, and that emissions for each year are below ten percent of the total construction project is not considered to be a regionally significant activity, and thus, the project construction emissions conform to the SIP.

The Draft General Conformity Determination can be downloaded from the USACE website at http://www.swg.usace.army.mil/. A hard copy of the report will also be made available upon request. Requests and comments should be submitted to Ms. Carolyn Murphy, Chief, Environmental Section (PE-PR), U.S. Army Corps of Engineers, 2000 Fort Point Road, Galveston, Texas 77553 (carolyn.e.murphy@swg02.usace.army.mil). Comments should be submitted by April 2, 2007.

Published: March 2, 2007
00112784

A F F I D A V I T

County of Galveston §
§
State of Texas §

Before me, the undersigned authority, on this day personally came and appeared **Lois Colvin**, to me well known (or proved to me on the basis of satisfactory evidence), and who after being duly sworn (affirmed) did depose and say that she is an **AGENT** for **THE GALVESTON COUNTY DAILY NEWS**, a newspaper of general circulation, which has been continuously and regularly published for a period of not less than one year, in the County of Galveston, and that the **NOTICE**, a copy of which is hereto attached was published in said newspaper on the following days, to wit:

March 2, 2007

Lois Colvin
Agent Signature

Sworn and subscribed before me

On this the 2nd day of March, 2007

Lynette Tisdale
Notary for the State of Texas

NOTARY PUBLIC STATE OF TEXAS
LYNETTE TISDALE
Notary Public, State of Texas
My Commission Expires
February 11, 2008

NOTICE OF AVAILABILITY DRAFT GENERAL CONFORMITY DETERMINATION TEXAS CITY CHANNEL DEEPENING PROJECT GALVESTON COUNTY, TEXAS

The Galveston District, U.S. Army Corps of Engineers (USACE) has completed a Draft General Conformity Determination for the Federal Texas City Channel Deepening Project, a deep-draft navigation project serving the Port of Texas City in Galveston County, Texas. The project consists of deepening the existing 40-foot channel to 45 feet from Shoal Point to the Houston Ship Channel in Galveston Bay. The proposed Federal project accomplishes the channel deepening portion of the City of Texas City's Shoal Point Container Terminal Project, which received a Department of Army permit in 2003 and which has not been constructed. The permitted Shoal Point Project includes a six-berth marine container terminal with wharves, berthing areas and a new turning basin at Shoal Point, and deepening the Texas City Channel to -45 feet MLT. The Environmental Impact Statement (EIS) for the Shoal Point Project included a General Conformity Determination which demonstrated that the project was compliant with the Clean Air Act. The projected Shoal Point construction emissions were subsequently accounted for in the Houston-Galveston-Brazoria (HGB) Area State Implementation Plan (SIP). The current Draft General Conformity Determination addresses minor additional construction impacts not accounted for in the Shoal Point EIS General Conformity Determination including deepening the existing turning basin, minor bend easing of the main navigation channel, and construction of a new, 75-acre beach nourishment placement area on the north side of the Texas City Dike.

The Federal Texas City Channel Deepening Project Draft General Conformity Determination was prepared pursuant to the Clean Air Act, Section 176(c)(1), and 40 CFR Part 51, Subpart W to assess whether the emission associated with the new project features conform with the HGB SIP. The analysis determined that emissions for each year of construction are less than the designated emission inventory presented in the 2004 emissions inventory for both NOX and VOC's based on the 2004 SIP. As a result, this SIP, and that emissions for each year are below ten percent of the total construction project is not considered to be a regionally significant activity, and thus, the project construction emissions conform to the SIP.

The Draft General Conformity Determination can be downloaded from the USACE website at http://www.swg.usace.army.mil/. A hard copy of the report will also be made available upon request. Requests and comments should be submitted to Ms. Carolyn Murphy, Chief, Environmental Section (PE-PR), U.S. Army Corps of Engineers.

ted to Ms. Carolyn Murphy, Chief, Environmental Section (PE-PR), U.S. Army Corps of Engineers, 2000 Fort Point Road, Galveston, Texas 77553 (carolyn.e.murphy@swg02.usace.army.mil). Comments should be submitted by April 2, 2007.

AFFIDAVIT OF PUBLICATION

STATE OF TEXAS:

COUNTY OF HARRIS:

Before me, the undersigned authority, a Notary Public in and for the State of Texas, on the day personally appeared: VICKI EUBANKS, who after being duly sworn, says that she is the ACCOUNTS RECEIVABLE LEAD at the HOUSTON CHRONICLE, a daily newspaper published in Harris County, Texas, and that the publication, of which the annexed herein, or attached to, is a true and correct copy, was published to-wit:

U.S. ARMY CORPS OF ENGINEERS 21728715 89418125
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Vicki Eubanks

VICKI EUBANKS
ACCOUNTS RECEIVABLE LEAD

Sworn and subscribed to before me, this the 1st Day of March A.D. 2007

NOTARY PUBLIC STATE OF TEXAS
PENNY STOW
NOTARY PUBLIC, STATE OF TEXAS
MY COMMISSION EXPIRES
FEB. 4, 2010

Penny Stow

Notary Public in and for the State of Texas

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

May 25, 2007

Colonel David C. Weston
District Commander
Galveston District
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Subject: General conformity concurrence for Texas City channel deepening project

Dear Colonel Weston:

This letter provides general conformity concurrence for the proposed Texas City channel deepening project. The Texas Commission on Environmental Quality (TCEQ) reviewed the project in accordance with Title 40 Code of Federal Regulations Part TCEQ 93, and Title 30 Texas Administrative Code Section 101.30 (30 TAC § 101.30) of the TCEQ general rules. The proposed project is located in the Houston-Galveston-Brazoria (HGB) area, which is classified as moderate nonattainment for ozone, and emissions are expected to be above the 100 tons-per-year *de minimis* threshold. Therefore, a general conformity analysis is required.

The TCEQ has determined, pursuant to 30 TAC § 101.30(h)(1)(E)(i)(I), that emissions from the proposed project will not exceed emissions from the applicable state implementation plan, the HGB Midcourse Review adopted by the TCEQ Commission December 1, 2004, and approved by the U.S. Environmental Protection Agency September 6, 2006. This finding is based upon information provided in a February 2007 Draft General Conformity Determination prepared for the U.S. Army Corps of Engineers (USACE).

In support of the national ambient air quality standards, the TCEQ suggests the USACE adopt pollution prevention and/or reduction measures in conjunction with this and future projects, such as the following:

- encourage construction contractors to apply for Texas Emission Reduction Plan grants;
- establish bidding conditions that give preference to clean contractors;
- direct construction contractors to exercise air quality best management practices;
- direct contractors that will use tugboats during construction to use clean fuels;
- direct operators of the assist tugboats used in maneuvering dredge vessels to use clean fuels;
- select assist tugs based on lowest NO_x emissions instead of lowest price; and
- purchase and permanently retire surplus NO_x offsets prior to commencement of operations.

Lastly, I would appreciate receiving an update as appropriate as this project moves forward. Thank you for providing the information and staff assistance necessary for our review. I look forward to working with you in the future on any upcoming projects you may have that affect air quality in your district. If you require further assistance on this matter, please contact John Guerra of my staff at (512)239-1469 or jguerra@tceq.state.tx.us.

Sincerely,

Richard C Chism

For Susana M. Hildebrand P.E., Director
Air Quality Division

cc: Ms. Carolyn Murphy, Chief, Environmental Section, USACE
Mr. Jeffrey Riley, EPA Region 6

Texas City Channel Deepening Project
General Reevaluation Report and
Environmental Assessment
October 2007

Appendix E
Agency Coordination Appendix

- January 18, 2007 Correspondence w/ USFWS, TCEQ "Water Quality Division", TGLO and NMFS
- February 16, 2007 Correspondence w/ TCEQ, Water Quality Division
- March 14, 2007 Correspondence w/ TCEQ, Water Quality Division
- April 18, 2007 Correspondence from TCEQ, Water Quality Division (401 Water Quality Certificate)
- February 14, 2007 Correspondence from USFWS (letter stating "No Effect" for Endangered Species Act & Planning Aid Letter Conveying Concurrence)
- February 16, 2007 Correspondence from NMFS (letter stating No Further Essential Fish Habitat Consultation Required)
- April 10, 2007 Correspondence from NMFS (No Adverse Affect letter)
- February 27, 2007 Correspondence from TGLO (letter stating CMP Consistency Determination)

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

January 18, 2007

Environmental Section

Steve Parris
Field Supervisor
U.S. Fish and Wildlife Service
Clear Lake Ecological Services Field Office
17629 El Camino Real, Suite 211
Houston, TX 77058

Dear Mr. Parris:

The Galveston District, Corps of Engineers requests your review of the enclosed Draft Limited Reevaluation Report and Environmental Assessment (DEA) and Biological Assessment (BA) for the proposed deepening of the Texas City Channel, Galveston Bay, Texas. The proposed project involves hydraulically dredging the existing 40-foot channel five feet deeper from Shoal Point to the intersection with the Houston Ship Channel (HSC), while maintaining the current 400-foot width. This is largely the same project coordinated in the 2003 Final Environmental Impact Statement (FEIS) for the Shoal Point Container Terminal coordinated under Department of Army permit number 21979, which was found to be compliant with the Endangered Species Act (ESA). The FEIS is incorporated by reference into the current DEA. All of the approximately 5.2 million cubic yards (mcy) of material dredged from the channel for the currently proposed project will be used beneficially for either marsh creation or beach nourishment. The DEA was prepared primarily to address minor project changes including the construction of two, 500-foot rock groins on the north side of the Texas City Dike and designation of a new beach placement area between the groins. Project details can be found in the enclosed DEA.

The BA was structured to address issues and information requested by the National Marine Fisheries Service (NMFS) in response to review of an earlier draft of the BA (NMFS correspondence dated March 16, 2006, attached to the BA). We believe that the DEA and revised BA now provide sufficient information for both Services to find the project compliant with the ESA. Please contact us immediately if additional information is needed or if you have questions concerning the project.

MURPHY
PE-PR

Public and agency comments will be accepted through February 16, 2007. The Shoal Point Container Terminal FEIS can be downloaded from the Galveston District website at http://www.swg.usace.army.mil/, as can this DEA. Comments on the DEA should be submitted to Ms. Carolyn Murphy, Chief, Environmental Section (PE-PR), U.S. Army Corps of Engineers, 2000 Fort Point Road, Galveston, Texas 77553, or may be sent by email to carolyn.e.murphy@swg02.usace.army.mil.

Any questions concerning this request or the project should be directed to Ms. Kristy Morten at (409) 766-3195, or kristy.l.morten@swg02.usace.army.mil.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Enclosure

CF w/out encl:

David M. Bernhart
Assistant RA for Protected Resources
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, FL 33701

CESWG-PE-PL, Mr. Walsdorf
CESWG-PM, Ms. Tirpak

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

January 18, 2007

Environmental Section

Mr. Mark Fisher
Manager, Water Quality Assessment Section
Texas Commission on Environmental Quality
MC150
P.O. Box 13087
Capitol Station Austin, Texas 78711-3087

Dear Mr. Fisher:

The Galveston District, Corps of Engineers requests your review of the enclosed Draft Limited Reevaluation Report and Environmental Assessment (DEA) and issuance of water quality certification under Section 401 of the Clean Water Act (CWA) for the proposed deepening of the Texas City Channel, Galveston Bay, Texas. The proposed project involves hydraulically dredging the existing 40-foot channel five feet deeper from Shoal Point to the intersection with the Houston Ship Channel (HSC), while maintaining the current 400-foot width. This is largely the same project coordinated in the 2003 Final Environmental Impact Statement (FEIS) for the Shoal Point Container Terminal coordinated under Department of Army permit number 21979. The FEIS is incorporated by reference into the current DEA. All of the approximately 5.2 million cubic yards (mcy) of material dredged from the channel for the currently proposed project will be used beneficially for either marsh creation or beach nourishment. This project will require a State Water Quality Certificate for discharge from the placement areas. The proposed discharge is described in the enclosed DEA, and a CWA Section 404(b)(1) evaluation is included as Appendix C. Information presented in the DEA indicates that Texas Surface Water Quality Standards will not be exceeded by the proposed project.

It is requested that the Texas Commission on Environmental Quality review the DEA and issue Section 401 State Water Quality Certification for the proposed project during our public comment period. Public and agency comments will be accepted through February 16, 2007. The Shoal Point Container Terminal FEIS can be downloaded from the Galveston District website at http://www.swg.usace.army.mil/, as can this DEA. Comments on the DEA should be submitted to Ms. Carolyn Murphy, Chief, Environmental Section (PE-PR), U.S. Army Corps of Engineers, 2000 Fort Point Road, Galveston, Texas 77553, or may be sent by email to carolyn.e.murphy@swg02.usace.army.mil.

MORTEN/3195
1/18/07
PE-PR

MURPHY
PE-PR

Any questions concerning this request or the project should be directed to Ms. Kristy Morten at (409) 766-3195 or kristy.l.morten@swg02.usace.army.mil.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Enclosure

CF w/out encl:

CESWG-PE-PL, Mr. Walsdorf
CESWG-PM, Ms. Tirpak

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

January 18, 2007

Environmental Section

Mr. Ben Rhame
Team Leader
Coastal Management Program
Texas General Land Office
P.O. Box 12873
Austin, TX 78711-2873

Dear Mr. Rhame:

The Galveston District, Corps of Engineers requests your review of the enclosed Draft Limited Reevaluation Report and Environmental Assessment (DEA) and issuance of a consistency determination in compliance with the Texas Coastal Management Program (CMP) for new project features for the proposed deepening of the Texas City Channel, Galveston Bay, Texas. The proposed project involves hydraulically dredging the existing 40-foot channel five feet deeper from Shoal Point to the intersection with the Houston Ship Channel (HSC), while maintaining the current 400-foot width. This is largely the same project coordinated in the 2003 Final Environmental Impact Statement (FEIS) for the Shoal Point Container Terminal coordinated under Department of Army permit number 21979, which was found to be consistent. The FEIS is incorporated by reference into the current DEA. All of the approximately 5.2 million cubic yards (mcy) of material dredged from the channel for the currently proposed project will be used beneficially for either marsh creation or beach nourishment. The DEA was prepared primarily to address minor project changes including the construction of two, 500-foot rock groins on the north side of the Texas City Dike and designation of a new beach placement area between the groins. Project details can be found in the enclosed DEA, and a consistency evaluation addressing the new project features of groin construction and beach placement is attached to this letter.

It is requested that the Texas General Land Office review the DEA and find the new project features consistent with the CMP during our public comment period. Public and agency comments will be accepted through February 16, 2007. The Shoal Point Container Terminal FEIS can be downloaded from the Galveston District website at http://www.swg.usace.army.mil/, as can this DEA. Comments on the DEA should be submitted to Ms. Carolyn Murphy, Chief, Environmental Section (PE-PR), U.S. Army Corps of Engineers, 2000 Fort Point Road, Galveston, Texas 77553, or may be sent by email to carolyn.e.murphy@swg02.usace.army.mil.

Any questions concerning this request or the project should be directed to Ms. Kristy Morten at (409) 766-3195 or kristy.l.morten@swg02.usace.army.mil.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Enclosure

CF w/out encl:

CESWG-PE-PL, Mr. Walsdorf
CESWG-PM, Ms. Tirpak

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

January 18, 2007

Environmental Section

Rusty Swafford
National Marine Fisheries Service
4700 Avenue U
Galveston, TX 77551-5997

Dear Mr. Swafford:

The Galveston District, Corps of Engineers requests your review of the enclosed Draft Limited Reevaluation Report and Environmental Assessment (DEA) for the proposed deepening of the Texas City Channel, Galveston Bay, Texas. The DEA is submitted to you to initiate essential fish habitat (EFH) consultation under the Magnuson-Stevens Fishery Conservation and Management Act. The proposed project involves hydraulically dredging the existing 40-foot channel five feet deeper from Shoal Point to the intersection with the Houston Ship Channel (HSC), while maintaining the current 400-foot width. This is largely the same project coordinated in the 2003 Final Environmental Impact Statement (FEIS) for the Shoal Point Container Terminal coordinated under Department of Army permit number 21979, which was found to be compliant with the Endangered Species Act (ESA). The FEIS is incorporated by reference into the current DEA. All of the approximately 5.2 million cubic yards (mcy) of material dredged from the channel for the currently proposed project will be used beneficially for either marsh creation or beach nourishment. The DEA was prepared primarily to address minor project changes including the construction of two, 500-foot rock groins on the north side of the Texas City Dike and designation of a new beach placement area between the groins. Project details can be found in the enclosed DEA. Please contact us immediately if additional information is needed for EFH consultation.

Public and agency comments will be accepted through February 16, 2007. The Shoal Point Container Terminal FEIS can be downloaded from the Galveston District website at http://www.swg.usace.army.mil/, as can this DEA. Comments on the DEA should be submitted to Ms. Carolyn Murphy, Chief, Environmental Section (PE-PR), U.S. Army Corps of Engineers, 2000 Fort Point Road, Galveston, Texas 77553, or may be sent by email to carolyn.e.murphy@swg02.usace.army.mil.

MORTEN/3195
1/18/07
PE-PR

MURPHY
PE-PR

Any questions concerning this request or the project should be directed to Ms. Kristy Morten at (409) 766-3195 or kristy.l.morten@swg02.usace.army.mil.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Enclosure

CF w/out encl:

Andreas Mager, Jr.
Assistant RA for Habitat Conservation
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, FL 33701

CESWG-PE-PL, Mr. Walsdorf
CESWG-PM, Ms. Tirpak

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

January 18, 2007

Environmental Section

Mr. Steve Parris
Field Supervisor
U.S. Fish and Wildlife Service
Clear Lake Ecological Services Field Office
17629 El Camino Real, Suite 211
Houston, TX 77058

Dear Mr. Parris:

The Galveston District, Corps of Engineers requests your review of the enclosed Draft Limited Reevaluation Report and Environmental Assessment (DEA) and Biological Assessment (BA) for the proposed deepening of the Texas City Channel, Galveston Bay, Texas. The proposed project involves hydraulically dredging the existing 40-foot channel five feet deeper from Shoal Point to the intersection with the Houston Ship Channel (HSC), while maintaining the current 400-foot width. This is largely the same project coordinated in the 2003 Final Environmental Impact Statement (FEIS) for the Shoal Point Container Terminal coordinated under Department of Army permit number 21979, which was found to be compliant with the Endangered Species Act (ESA). The FEIS is incorporated by reference into the current DEA. All of the approximately 5.2 million cubic yards (mcy) of material dredged from the channel for the currently proposed project will be used beneficially for either marsh creation or beach nourishment. The DEA was prepared primarily to address minor project changes including the construction of two, 500-foot rock groins on the north side of the Texas City Dike and designation of a new beach placement area between the groins. Project details can be found in the enclosed DEA.

The BA was structured to address issues and information you requested in your March 16, 2006 correspondence responding to an earlier BA prepared for this project. We believe that the DEA and revised BA will now provide sufficient information for you to find the project compliant with the ESA. Please contact us immediately if additional information is needed or if you have questions concerning the project.

Public and agency comments will be accepted through February 16, 2007. The Shoal Point Container Terminal FEIS can be downloaded from the Galveston District website at http://www.swg.usace.army.mil/, as can this DEA. Comments on the DEA should be submitted to Ms. Carolyn Murphy, Chief, Environmental Section (PE-PR), U.S. Army Corps of Engineers, 2000 Fort Point Road, Galveston, Texas 77553, or may be sent by email to carolyn.e.murphy@swg02.usace.army.mil.

MORTEN/3195
1/18/07
PE-PR

MURPHY
PE-PR

Any questions concerning this request or the project should be directed to Ms. Kristy Morten at (409) 766-3195 or kristy.l.morten@swg02.usace.army.mil.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Enclosure

CF w/out encl:

USFWS-Clear Creek
CESWG-PE-PL, Mr. Walsdorf
CESWG-PM, Ms. Tirpak

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

January18, 2007

Environmental Section

David M. Bernhart
Assistant RA for Protected Resources
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, FL 33701

Dear Mr. Bernhart:

The Galveston District, Corps of Engineers requests your review of the enclosed Draft Limited Reevaluation Report and Environmental Assessment (DEA) and Biological Assessment (BA) for the proposed deepening of the Texas City Channel, Galveston Bay, Texas. The proposed project involves hydraulically dredging the existing 40-foot channel five feet deeper from Shoal Point to the intersection with the Houston Ship Channel (HSC), while maintaining the current 400-foot width. This is largely the same project coordinated in the 2003 Final Environmental Impact Statement (FEIS) for the Shoal Point Container Terminal coordinated under Department of Army permit number 21979, which was found to be compliant with the Endangered Species Act (ESA). The FEIS is incorporated by reference into the current DEA. All of the approximately 5.2 million cubic yards (mcy) of material dredged from the channel for the currently proposed project will be used beneficially for either marsh creation or beach nourishment. The DEA was prepared primarily to address minor project changes including the construction of two, 500-foot rock groins on the north side of the Texas City Dike and designation of a new beach placement area between the groins. Project details can be found in the enclosed DEA.

The BA was structured to address issues and information you requested in your March 16, 2006 correspondence responding to an earlier BA prepared for this project. We believe that the DEA and revised BA will now provide sufficient information for you to find the project compliant with the ESA. Please contact us immediately if additional information is needed or if you have questions concerning the project.

Public and agency comments will be accepted through February 16, 2007. The Shoal Point Container Terminal FEIS can be downloaded from the Galveston District website at http://www.swg.usace.army.mil/, as can this DEA. Comments on the DEA should be submitted to Ms. Carolyn Murphy, Chief, Environmental Section (PE-PR), U.S. Army Corps of Engineers, 2000 Fort Point Road, Galveston, Texas 77553, or may be sent by email to carolyn.e.murphy@swg02.usace.army.mil.

Any questions concerning this request or the project should be directed to Ms. Kristy Morten at (409) 766-3195 or kristy.l.morten@swg02.usace.army.mil.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Enclosure

CF w/out encl:

Mr. Steve Parris
Field Supervisor
U.S. Fish and Wildlife Service
Clear Lake Ecological Services Field Office
17629 El Camino Real, Suite 211
Houston, TX 77058

CESWG-PE-PL, Mr. Walsdorf
CESWG-PM, Ms. Tirpak

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 16, 2007

Ms. Kristi Morten
U.S. Army Corps of Engineers
Galveston District CESWG-PE-RE
P.O. Box 1229
Galveston, Texas 77553-1229

Re: Draft Limited Reevaluation Report and Environmental Assessment and Biological Assessment for the proposed Deepening of the Texas City Channel

Dear Ms. Morten:

A response was requested in a letter attached to the Draft Limited Reevaluation Report and Environmental Assessment (EA) and Biological Assessment for the proposed Deepening of the Texas City Channel, dated January 18, 2007. The project proposes to deepen the Texas City Channel approximately from the intersection with the Houston Ship Channel up to and including the Texas City Turning Basin. The locally preferred plan would be for a deepened channel and turning basin that will be dredged to 45 feet below mean low tide plus 2 feet of advanced maintenance dredging, and one 1 foot allowable over depth. The project will not increase the width of the channel, and will result in only incidental easings of channel bends. The project is located in Galveston Bay system. This basic project was previously reviewed in a 1982, 1989, and 1997 as a part of a larger federal project to improve the Texas City Channel as a federal project authorized by Congress.

In addition to the information contained in the public notice, the following information is needed for review and certification of the proposed project. Responses to this letter may raise other questions that will need to be addressed before a water quality certification determination can be made.

1. The public notice states that the applicant plans to dispose of the dredge material in contained disposal areas. The Texas Commission on Environmental Quality (TCEQ) requires that the effluent from contained disposal areas not exceed a total suspended solids concentration of 300 milligrams per liter. Please confirm this will be a requirement of the permit.

2. The EA states that elutriate tests will be performed routinely, but does not specify intervals, or increased sampling intervals to address known hazardous material sites, or how hazardous materials placement will be managed if they occur within the footprint of the project.

Ms. Kristi Morten
U.S. Army Corps of Engineers
USACE Draft Limited Reevaluation Report and Environmental Assessment and Biological Assessment for the Proposed Deepening of the Texas City Channel
Page 2
February 16, 2007

3. The proposed project includes maintenance dredging. Exact dredging intervals, or how they will change from the existing channel to the proposed one are not set out in the EA. Dredging will disturb the area, and it is unclear if the frequency of the events will change due to the proposed project. Please specify the change in dredging intervals between the existing and proposed channel.

4. The EA states that several placement and beneficial use sites will be associated with this project, and will result in the loss of 1161.6 acres of bay bottom. The EA also states that the Shoal Point and Pelican Island placement areas are intended to be converted to an emergent marsh. Mention is made that the beneficial use areas will be filled to an elevation conducive to growth of intertidal marsh and be planted and monitored. However, a mitigation plan detailing the mitigation for specific impacts with a success criteria and contingency plan does not appear to have been presented in this EA. It is not assured that the project has provided adequate mitigation that will meet the TCEQ's goal of no net loss of functions and values due to the direct impacts of dredging, placement of material in shallow bay bottom, as well as the possible secondary and cumulative impacts due to the project. As stated the project does detail 1161.6 acres in beneficial use areas raised to intertidal marsh, and those areas could easily satisfy this goal if success criteria and a contingency plan for these areas were included. Please provide a more detailed mitigation plan that satisfies these concerns, and that will replace the functions and values of the existing onsite resources that will be impacted due to this project, as well as those which will be impacted due to the project.

The TCEQ looks forward to receiving and evaluating other agency or public comments. Please provide any agency comments, public comments, as well as the applicant's comments, to Mr. Robert Burgess of the Water Quality Division MC-150, P.O. Box 13087, Austin, Texas 78711-3087. Mr. Burgess may also be contacted by e-mail at *rburgess@tceq.state.tx.us* or by telephone at (512) 239-3163.

Sincerely,

for L'Oreal Stepney

L'Oreal W. Stepney, PE, Director
Water Quality Division
Texas Commission on Environmental Quality

LWS/RB/jr

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

March 14, 2007

Environmental Section

Ms. L'Oreal W. Stepney, PE
Director, Water Quality Division
Texas Commission on Environmental Quality
MC150
P.O. Box 13087
Capitol Station Austin, Texas 78711-3087

Dear Ms. Stepney:

This is in response to your February 16, 2007 letter providing review comments on the Draft General Reevaluation Report (GRR) and Environmental Assessment (EA) for the Federal Texas City Channel (TCC) Deepening Project and requesting additional information before Section 401 certification can be granted for the project. The following information is provided to address issues raised in your letter by numbered comment. We would like to clarify that this is a Federal project and not a permit action, as alluded to in several of your comments.

Item 1: 300mg/l requirement. The placement areas to be used are a combination of upland confined areas and Beneficial Use (BU) sites. The upland confined areas (PAs 5 and 6) are historically-used sites that continue to be used for routine maintenance of the existing channel. These sites have an existing 401 Certification, therefore we are not seeking re-certification of these areas. The new sites are designed for marsh creation. Even though some confinement is necessary to retain dredged material, there will not be any drop-outlet water control structures that allow adjustment of ponding depth to clarify effluent, typically used in upland confined areas. The ability to control ponding depth with such a structure, would require a levee height much greater than needed for the designed BU. This is not practical and would result in unnecessary excavation to construct the levees. In similar marsh creation BU projects constructed by the Galveston District, a section of one of the levees is built slightly lower than surrounding levees. This is referred to as an overflow weir and allows for some ponding and effluent clarification, but cannot control TSS to the degree that a drop-outlet structure would. The design of these BU marshes will include overflow weirs. For these reasons, a TSS limitation should not be imposed on this project.

Item 2: Elutriate Testing. Maintenance dredging of the TCC generally occurs on a three-year cycle. Water and sediment samples are routinely collected from the channel and analyzed, along with elutriate samples, for a suite of contaminants of concern prior to dredging to ensure sediments and the effluent discharge water do not violate Texas Surface Water Quality Standards.

A hazardous materials survey conducted for the project did not identify any hazardous material sites that would be impacted by the Federal project. Therefore, there is no cause to increase the frequency of sampling.

Item 3: Dredging Frequency. The channel is currently dredged on a three-year cycle. Historically, widening, rather than deepening a channel has proven to be the main factor in increasing the shoaling rate and increasing dredging cycles. Deepening the channel by five feet is considered nominal and will not alter the shoaling rate or frequency of maintenance dredging, which is projected to continue on a three-year cycle..

Item 4: Mitigation Plan. There are no project impacts that require mitigation. The marsh creation described in the EA will result from the beneficial use of dredged material in compliance with Corps policy, state consistency regulations, and the goals of the Galveston Bay National Estuary Program. The Galveston Bay system has lost approximately half of its wetlands in historic times due to erosion, subsidence, and development. Construction and restoration of wetlands in Galveston Bay is a critical goal shared by state and Federal resource agencies and private environmental organizations. These organizations support the conversion of shallow bay bottom to intertidal marsh as proposed for this project. Success criteria for marsh created by beneficial use of dredged material are included in the Shoal Point EIS coordinated under Department of Army permit number 21979 and incorporated by reference into the TCC EA. The success criteria for the project can be found beginning on page 23 of Appendix B of the Shoal Point EIS, previously provided to your agency and available on our web page at http://www.swg.usace.army.mil.

With submission of this requested additional project information, the Galveston District, Corps of Engineers requests that the Texas Commission on Environmental Quality issue a Clean Water Act Section 401 State Water Quality Certification for the proposed Federal Texas City Channel Deepening Project, Galveston County, Texas. If you have additional comments or questions concerning this project or require additional information, please contact Ms. Kristy Morten at (409) 766-3195 so that a teleconference can be arranged to facilitate issuance of the certification.

Sincerely,

Rick Medina
Chief, Planning and Environmental Branch

CF:
CESWG-PE-PL, Mr. Walsdorf
CESWG-PM, Ms. Tirpak

Kathleen Hartnett White, *Chairman*
Larry R. Soward, *Commissioner*
H. S. Buddy Garcia, *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

April 18, 2007

Ms. Kristi Morten
U.S. Army Corps of Engineers
Galveston District CESWG-PE-RE
P.O. Box 1229
Galveston, Texas 77553-1229

Re: USACE Draft General Reevaluation Report and Environmental Assessment for the Federal Texas City Channel Deeping Project

Dear Ms. Morten:

This letter is in response to the Environmental Assessment (EA) dated January 18, 2007, on the proposed Texas City Channel Deeping Project. The project is located in Galveston County, Texas.

The Texas Commission on Environmental Quality (TCEQ) has reviewed the EA. Based on our evaluation of the information contained in these documents, and the March 14, 2007, response to TCEQ concerns, the TCEQ certifies that there is reasonable assurance that the project will be conducted in a way that will not violate water quality standards.

The project proposes to deepen the Texas City Channel approximately from the intersection with the Houston Ship Channel up to and including the Texas City Turning Basin. The locally preferred plan would be for a deepened channel and turning basin that will be dredged to 45 feet below mean low tide plus 2 feet of advanced maintenance dredging, and one 1 foot allowable over depth. The project will not increase the width of the channel, and will result in only incidental easings of channel bends. The project is located in Galveston Bay system.

The project will include a beneficial use of the dredged material for 1161.6 acres of wetland creation to replace any functions or values that will be directly or secondarily impacted by the project. The success criteria for the marsh creation is included in the Shoal Point EIS under army permit number 21979.

No review of property rights, location of property lines, nor the distinction between public and private ownership has been made, and this certification may not be used in any way with regard to questions of ownership.

P.O. Box 13087 • Austin, Texas 78711-3087 • 512-239-1000 • Internet address: www.tceq.state.tx.us

If you require additional information or further assistance, please contact Mr. Robert Burgess of the Water Quality Division MC-150, P.O. Box 13087, Austin, Texas 78711-3087. Mr. Burgess may also be contacted by e-mail at rburgess@tceq.state.tx.us or by telephone at (512) 239-3163.

Sincerely,

LStepney

L'Oreal W. Stepney, PE, Director
Water Quality Division
Texas Commission on Environmental Quality

LWS/RB/jp

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051
281/286-8282 / (FAX) 281/488-5882

February 14, 2007

Carolyn Murphy
Chief, Environmental Section
Galveston District, Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Dear Ms. Murphy:

This correspondence is provided as a Planning Aid Letter from the U.S. Fish and Wildlife Service (Service) to assist you with the development of the Texas City Channel Deepening Project (TCCDP). We have reviewed the Draft Limited Reevaluation Report and Environmental Assessment (DEA) and Biological Assessment (BA) dated January 2007 for the proposed TCCDP. Our comments are provided in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661, et seq.), with section 7 of the Endangered Species Act of 1973 (87) Stat. 884, as amended; 16 U.S.C. 703 et seq.) and the Migratory Bird Treaty Act (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.).

The Service has been involved throughout the development of the Texas City Shoal Point Container Terminal (TCSPCT), the Environmental Impact Statement (EIS), the 50 year dredge material management plan (DMMP), and the development of the Beneficial Use Sites (BUS). The BUS has been renamed and will now be referred to as the Shoal Point Placement Areas (SPPA) and the Pelican Island Placement Area (PIPA). The DMMP approved for Shoal Point Department of Army Permit No. 21979 is the base plan for the current Federal project reevaluation study with the addition of minor modifications. Minor modifications include an additional beach nourishment placement area located north of the Texas City Dike and the construction of SPPA 2-5 becoming the responsibility of the Department of Army as part of this federal project. Additional project modifications include the construction of two groins, also located north of the Texas City Dike, consisting of clay material and topped with concrete rip-rap or approved quarried stone.

The Service along with other resource agencies developed guidelines for the development of the SPPA/PIPA. These guidelines included goals, objectives, performance standards, monitoring methods, and remedial actions for successful marsh creation within each SPPA/PIPA. These guidelines are outlined in the DMMP of the TCSPCT Final EIS, dated November 2002. These guidelines should be used for the approved SPPA/PIPA as well as any other new sites proposed. Existing dredge material beneficial use sites around Galveston Bay are continually being evaluated for the environmental benefits each provide and existing creation/restoration techniques are consistently being improved. The Service recommends the continuation of formal coordination with the USACE and other resource agencies for the life of this project in order to discuss habitat improvements related to the beneficial uses of dredge material. Any alterations in methods or modifications regarding the DMMP or the SPPA/PIPA should be discussed and evaluated by the resource agencies in cooperation with the USACE.

The USACE has determined that the proposed project will have no effect on any federally listed species or critical habitat under our jurisdiction. Under section 7(a)(2) of the Endangered Species Act, the federal action agency is responsible for determining the effects of their actions on listed species or critical habitat (50 CFR § 402.14 [a]). If the action agency determines its proposed action will have no effect on federally listed species or critical habitat, no contact with the Service is necessary. However, the USACE should maintain a complete record of the evaluation, including steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles. In the event the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Thank you for the opportunity to comment on this project and for your cooperation in protecting the important fish and wildlife resources in Galveston Bay. If you need any additional information, please contact me or Moni Belton at 281/286-8282.

Sincerely,

FOR Stephen D. Parris
Field Supervisor, Clear Lake ES Field Office

cc:
Corps of Engineers, Galveston District, Kristi Morten, Galveston, TX

FEB 16 2007 Reg

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue S
St. Petersburg, Florida 33701-5511

February 13, 2007

Colonel David C. Weston
District Engineer, Galveston District
Department of the Army, Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Dear Colonel Weston:

The NOAA's National Marine Fisheries Service (NMFS) has reviewed the Draft General Reevaluation Report and Environmental Assessment (DEA) for the Texas City Channel Deepening Project dated January 2007. The proposed project would deepen the existing Texas City Ship Channel from 40 feet deep to 45 feet deep. In April of 2003, The City of Texas City (also the non-federal sponsor for the proposed channel deepening project) received a Department of the Army permit authorizing a container terminal and the deepening of the Texas City Channel to 45 feet deep from the northern end of the turning basin to the intersection of the Texas City Channel with the Houston Ship Channel. During the development of the environmental impact statement (EIS) for the City's permit, a 50-year Dredged Material Management Plan (DMMP) was developed by an interagency committee, including NMFS, to accommodate the material from the container port project, as well as for the maintenance from the Texas City Ship Channel and the entire existing turning basin.

The recommended federal project plan covered in the DEA is very similar to the already permitted container terminal project and the Corps of Engineers plans to utilize the existing DMMP with some minor modifications. According to the DEA, approximately 1,000 acres of emergent tidal marsh wetlands would be created under the DMMP over the 50-year life of the project. According to the essential fish habitat assessment provided in the DEA for the Corps federal project and as referenced in the EIS for the City's permit, temporary impacts to federally managed species (e.g., shrimp and red drum) would occur during marsh cell construction, however the creation of approximately 1,000 acres of new emergent marsh habitat would offset the temporary impacts and ultimately be beneficial to these species. The NMFS concurs with the Corps assessment the adverse impacts will be temporary and the project will ultimately be very beneficial to federally managed species and to other living marine resources, provided that the beneficial use of dredged material sites are properly constructed, inspected, managed and monitored for the life of the project.

FEB 16 2007

In view of the overall project benefits to federally managed species, no further essential fish habitat consultation is required. We look forward to working closely with the Corps of Engineers and The City of Texas City in planning, the construction and monitoring activities identified in the DMMP. If we may be of further assistance, please contact Mr. Rusty Swafford of our Galveston Facility at (409) 766-3699.

Sincerely,

Rusty Swafford

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701
(727) 824-5312 FAX 824-5309
http://sero.nmfs.noaa.gov

APR 10 2007 F/SER31:KS

Ms. Carolyn Murphy
Galveston District Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553

Dear Ms. Murphy:

This responds to your January 18, 2007, letter and biological assessment (BA) submitted pursuant to section 7 of the Endangered Species Act (ESA) for the Army Corps of Engineers' (COE) proposed deepening of the Texas City Channel. The existing channel extends from Texas City on Galveston Bay to the Gulf of Mexico off Galveston County, Texas. You determined that the proposed project will have no adverse effects on sea turtles and requested our concurrence with your determination. The COE originally requested consultation for this project by letter dated February 7, 2006. In our letter dated March 16, 2006, the National Marine Fisheries Service (NMFS) requested additional project information, including characteristics of the project site and construction methods. The current BA contains the additional project information requested by NMFS and details several modifications to the original project.

The proposed project will deepen the Texas City Channel and turning basin from its existing 40-foot depth to 45 feet using a hydraulic cutterhead dredge. No widening of the channel would occur. Approximately 1,162 acres of Galveston Bay bottoms will be converted to emergent habitat by placement of dredged material. The majority of the 5.2 million cubic yards of material generated by the project will be used to construct 1,086 acres of previously permitted confined placement areas adjacent to Shoal Point and Pelican Island, south of the Texas City Channel. Once placement of dredged material in these areas has been completed, the material will be contoured and vegetation will be planted to create 999 acres of marsh. In addition, the portion of the dredged material consisting of beach-compatible sand will be placed in a 75-acre area on the north side of the Texas City Dike. Sand is routinely placed north of the dike, which is used as a fishing, boating, and swimming area. Two 500-foot armored groins, totaling 0.6 acre, will be constructed in the area of sand placement to reduce transport of the sand back into the Texas City Channel, potentially reducing the need for future maintenance dredging. Shallow draft barges, draglines, dozers, track hoes, and excavators will be used to construct levees and groins, deposit riprap, and shape marsh creation areas. The project is scheduled to commence in 2008 and will be completed in 3 segments over a 2-year period as funds are appropriated.

Five species of sea turtles (loggerhead, Kemp's ridley, green, leatherback, and hawksbill) can be found in Galveston Bay and may be affected by the proposed project. The BA notes that the species most likely to occur in the project area are Kemp's ridley and loggerhead sea turtles. NMFS foresees the following potential direct and indirect effects of the proposed action. Sea turtles may be affected by dredging and construction operations if they were to be struck by vessels, equipment, or dredged materials as they are being deposited; however, due to their mobility, the likelihood of this occurring is discountable. In addition, any sea turtles in the area will likely temporarily avoid the project site due to construction and vessel noise. Dredging will occur in 3 segments over the 2-year period; dredging in each segment will occur subject to funding. The longest dredging segment (28,000 feet) will occur in the portion of the channel adjacent to the south side of the Texas City Dike, including at the turning basin for the Port of Texas City. Because of the presence of the Texas City Dike, the channel has filled in very little and will require only minor dredging in portions of this segment. Two shorter segments (a 3000-foot segment and a 6000-foot segment) will also be dredged. Dredging in all three segments will occur in areas that are already highly utilized by marine vessels. Dredging in any one segment will not impede the transit of sea turtles within Galveston Bay. Any incremental increase in marine activities in this area is likely to be minor and temporary. Impacts to sea turtles from temporary avoidance of the dredging areas will be insignificant. Further, any sea turtles entering the project site during dredging activities are unlikely to be harmed by the cutterhead dredge; NMFS has previously determined that non-hopper-type dredging activities are not likely to adversely affect sea turtles.

The effects due to loss of foraging habitat in the dredged areas will be insignificant. Kemp's ridleys and loggerheads (the two most common species in the area) are generalist carnivores, typically preying on benthic mollusks and crustaceans in the nearshore environment. Both species can be found foraging in shallow sand-mud habitat. The BA states that benthic invertebrates will likely recolonize the project site within 3 to 12 months of project completion; since the project will occur in segments, it is likely that some segment(s) will have (at least partially) recolonized before the other segment(s) are dredged. Additionally, the permanent loss of 1,162 acres of water bottoms represents only 0.3 percent of the available foraging habitat in the 600-square mile Galveston Bay. The creation of 999 acres of marsh is likely to improve the water quality in this heavily industrialized area. Therefore, NMFS considers all potential direct and indirect project effects to listed species to be discountable or insignificant.

In summary, we believe the proposed action is not likely to adversely affect listed sea turtles. This concludes your consultation responsibilities under the ESA for species under NMFS' purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. We have enclosed additional information on other statutory requirements that may apply to this action, and on NMFS' Public Consultation Tracking System (PCTS) to allow you to track the status of this and other ESA consultations.

If you have any questions on this consultation or PCTS, please contact Kelly Shotts at (225) 389-0508 x 209, or by e-mail at kelly.shotts@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Southeast Regional Administrator

Enclosure

cc: F/SER46 – Swafford, HCD

File: 1514-22.F.1.TX
Ref: I/SER/2007/00261

Additional Considerations for ESA Section 7 Consultations (Revised 12-6-2005)

Marine Mammal Protection Act (MMPA) Recommendations: The Endangered Species Act (ESA) section 7 process does not authorize incidental takes of listed or non-listed marine mammals. If such takes may occur an incidental take authorization under MMPA section 101 (a)(5) is necessary. Contact Ken Hollingshead of our NMFS Headquarters' Protected Resources staff at (301) 713-2323 for more information on MMPA permitting procedures.

Essential Fish Habitat (EFH) Recommendations: In addition to its protected species/critical habitat consultation requirements with NMFS' Protected Resources Division (PRD) pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NMFS' Habitat Conservation Division (HCD) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act's (MSA) requirements for essential fish habitat (EFH) consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-.930, subpart K). The action agency should also ensure that the applicant understands the ESA and EFH processes; that ESA and EFH consultations are separate, distinct, and guided by different statutes, goals, and time lines for responding to the action agency; and that the action agency will (and the applicant may) receive separate consultation correspondence on NMFS letterhead from HCD regarding their concerns and/or finalizing EFH consultation.

Public Consultation Tracking System (PCTS) Guidance: PCTS is an online query system allowing federal agencies and U.S. Army Corps of Engineers' (COE) permit applicants to track the status of NMFS consultations under ESA section 7 and under MSA sections 305(b)2 and 305(b)(4): Essential Fish Habitat. Access PCTS via: www.nmfs.noaa.gov/pcts. Federal agencies are required to enter an agency-specific username and password to query the Federal Agency Site. The Corps Permit Site allows COE permit applicants the ability to check on the current status of Clean Water Act section 404 permit actions for which NMFS has conducted an ESA section 7 consultation with the COE since the beginning of the 2001 fiscal year (no password needed).

For COE-permitted projects, click on "Enter Corps Permit Site." From the "Choose Agency Subdivision (Required)" list, pick the appropriate COE district. At "Enter Agency Permit Number" type in the COE district identifier, hyphen, year, hyphen, number. The COE is in the processing of converting its permit application database to PCTS-compatible "ORM." An example permit number is: SAJ-2005-000001234-IPS-1. For the Jacksonville District, which has already converted to ORM, permit application numbers should be entered as SAJ (hyphen), followed by 4-digit year (hyphen), followed by permit application numeric identifier with no preceding zeros. E.g., SAJ-2005-123, SAJ-2005-1234, SAJ-2005-12345.

For inquiries regarding applications processed by Corps districts that have not yet made the conversion to ORM (e.g., Mobile District), enter the 9-digit numeric identifier, or convert the existing COE-assigned application number to 9 numeric digits by deleting all letters, hyphens, and commas; converting the year to 4-digit format (e.g., -04 to 2004); and adding additional zeros in front of the numeric identifier to make a total of 9 numeric digits. E.g., AL05-982-F converts to 200500982; MS05-04401-A converts to 200504401. PCTS questions should be directed to Eric Hawk at Eric.Hawk@noaa.gov. Requests for username and password should be directed to April Wolstencroft (PCTSUsersupport@noaa.gov).

Coastal Coordination Council

P.O. Box 12873 ♦ Austin, Texas 78711-2873 ♦ (800) 998-4GLO ♦ FAX (512) 475-0680

February 27, 2007

Ms. Carolyn Murphy
Chief, Environmental Section
US Army Corps of Engineers
PO Box 1229
Galveston, TX 77553-1229

Re: Texas City Channel Deepening Project, Galveston County, Texas. CMP#: 07-0097-F2

Dear Ms. Murphy:

Pursuant to Section 506.20 of 31 TAC of the Coastal Coordination Act, the project referenced above has been reviewed for consistency with the Texas Coastal Management Program (CMP).

It has been determined that there are no significant unresolved consistency issues with respect to the project. Therefore, this project is consistent with the CMP goals and policies.

Sincerely,

Tammy S. Brooks
Consistency Review Coordinator
Texas General Land Office

cc: Kristy Morten, COE

Texas City Channel Deepening Project
General Reevaluation Report and
Environmental Assessment
October 2007

Appendix F
Public Coordination

- June 2004 Public Scoping Meeting
- January 16, 2007 Notice of Availability for Draft GRR/Supplemental EA
- Project Mailing List
- February 14, 2007 Correspondence from Choctaw Nation of Oklahoma

June 2, 2004

Planning and Environmental Branch

Notice of Studies and Initial Public Scoping Meeting for Texas City Channel, Texas Limited Reevaluation Study

Introduction

This notice provides a summary of the ongoing and planned reevaluation study activities for the Texas City Channel, Texas and solicits public input regarding the study. The primary purpose of the authorized Texas City Channel project is to improve the navigational efficiency and safety of the existing waterway for movement of commerce. An opportunity also exists for environmental restoration through the beneficial use of dredged material. Recreation demands and needs of the area may also be addressed by using dredged material to enlarge the Texas City Dike.

Study Background

The Texas City Channel, shown in Figure 1, is a Federal deep-draft navigation channel serving the Port of Texas City in Galveston County, Texas. The existing project consists of a channel 40 feet deep, 400 feet wide and about 6.75 miles long, from Bolivar Roads to a turning basin at Texas City; and an Industrial Canal, extending a distance of 1.7 miles southwestward from the south end of Texas City Turning Basin; and ends at a turning basin. The Texas City Channel is protected from cross currents and shoaling by the Texas City Dike, which is 28,200 feet long, parallel to and north of the channel; and a rubble-mound dike, 27,600 feet long, along the southerly side of the pile dike. The 40-foot channel was completed in June 1967. Widening and realigning of the Texas City Turning Basin and enlargement through widening and deepening of the Industrial Canal and basins was initiated in July 1980 and completed in June 1982. The only work remaining is deferred construction consisting of widening the Industrial Canal from 250 feet to 300 feet at 40 feet depth.

At the request of the local sponsor, Congress has directed the Secretary of the Army to conduct this study. Section 201 of the Water Resources Development Act (WRDA) of 1986, Public Law 99-662, dated 17 November 1986, authorized the Texas City Channel 50-Foot project. The Texas City Channel Project Review and Assessment was submitted by the Corps of Engineers in September 1997. The results of the assessment revealed that the project was still economically justified, but put in question whether the 50-foot project was still the optimum depth for the Texas City Channel project.

Figure 1 — Vicinity Map

Study Status

In a letter to the Galveston District dated April 12, 2001, the project sponsor, the City of Texas City, requested reactivation of the Texas City Channel project. Their request was based on the emergence of the Shoal Point Container Terminal project and the Port of Texas City and the Texas City Channel Users' renewed interest in deepening the Texas City Channel and existing turning basin to a depth of 45 feet. Preliminary alternatives to be evaluated in the Feasibility Phase include:

- Deepening from the Texas City Channel to 44- and 45-feet;
- Using Dredged Material to enhance the Texas City Dike.

Study Process

Study requirements contained in USACE regulations allow for projects to deviate from the National Economic Development (NED) plan and/or the National Ecosystem Restoration (NER) plans if requested by the non-Federal sponsor and approved by ASA (CW). Plans requested by the non-Federal sponsor that deviate from these plans are identified as the Locally Preferred Plan (LPP). The City of Texas City's LPP is a 45-ft x 400-ft navigation channel, which is less than the previously identified 50-ft x 600-ft NED Plan.

The scope for the reevaluation study will include preliminary screening of two channel depths (44 and 45 feet) and one channel width (400 feet) during the initial plan formulation phase. At the conclusion of the preliminary screening, the project sponsor will have the opportunity to reaffirm that the LPP is the 45-ft x 400-ft so long as the net benefits are not maximized at the shallower depth. The plan formulation phase of this study will consist of verifying dredged material quantities for placement; evaluating placement areas; formulating the dredged material management plan; and further refining the cost and constructibility of the recommended plan. As a result of the reevaluation study, final decision and supporting technical documents will be produced which identify the recommended plan.

Purpose of Public Scoping Meeting

The Galveston District will hold the initial Public Scoping Meeting for the Limited Reevaluation Study on:

Date: June 22, 2004

Location: Charles T. Doyle Convention Center
2010 5th Avenue
Texas City, TX 77590

Time: 6:00 pm to 8:00 pm

The purpose of this public scoping meeting will be to inform the community about the proposed study and how the study will be conducted. The public will be provided the opportunity to help the Galveston District and the Non-Federal Sponsor, the City of Texas City, identify environmental concerns, identify study efforts needed to resolve these concerns, and to meet the National Environmental Policy Act requirements for preparing a Supplemental Environmental Impact Statement. Every effort will be made to address concerns/issues identified. This notice serves as an invitation to the public to attend. The public will be provided an opportunity to make comments.

Specifically, public input is requested concerning:

- Operational issues associated with the Texas City Channel;
- Channel associated modifications that could improve the quality of the environment in the overall public interest;
- Issues associated with current dredged material disposal practices;
- Opportunities for the beneficial uses of dredged material; and
- Development of the long-term disposal plan.

Please write to the address shown on the first page of this notice if you have information or questions concerning the study. Written comments will be accepted for 30 days following the meeting or until July 22, 2004. If you need additional information or have questions concerning this notice, please contact Mr. Steve Ireland by phone at (409) 766-3131 or by email at steven.k.ireland@usace.army.mil or Ms. Kim Crawford at (409) 766-3146 or by email at kim.n.crawford@usace.army.mil.

LEONARD D. WATERWORTH
Colonel, US Army Corps of Engineers
District Engineer

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

January 16, 2007

Environmental Section

NOTICE OF AVAILABILITY

TEXAS CITY CHANNEL DEEPENING PROJECT
GALVESTON COUNTY, TEXAS

DRAFT GENERAL REEVALUATION REPORT
AND
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

The Galveston District, U.S. Army Corps of Engineers has completed a Draft General Reevaluation Report (GRR) and Supplemental Environmental Assessment (EA) for the Texas City Channel Deepening Project. The Texas City Channel is a Federal deep-draft navigation project serving the Port of Texas City in Galveston County, Texas. It consists of a main channel connecting a turning basin at the port to the Gulf of Mexico through Bolivar roads, a part of the Houston Ship Channel.

In April 2003 the City of Texas City (also the non-Federal Sponsor for the Federal Channel Deepening Project) received a Department of Army permit to construct a six-berth marine container terminal including wharves, berthing areas, turning basin, and the deepening of the Texas City Channel to -45 feet MLT from the northern end of the turning basin to the intersection of the Texas City Channel and the Houston Ship Channel. During the development of the Shoal Point Container Terminal Environmental Impact Statement (EIS), a 50-year Dredged Material Management Plan (DMMP) was developed.

The recommended Federal project and the channel deepening portion of the permit for the container terminal are very similar. Both projects would deepen the channel from the current depth of 40 feet to 45 feet. No channel widening is expected, other than the incidental widening recommended for the Federal project for bend easing purposes. The primary difference between the permitted plan and the recommended Federal project is that the Federal project plan includes the deepening of the existing turning basin, while the permitted plan would dredge a new turning basin within the channel directly adjacent to the berthing areas. In addition, the Federal project would place two rock groins on the north side of the Texas City Dike (located on the northern side of the channel) to help slow sedimentation of material back into the main channel.

The DMMP that was developed for the EIS will accommodate dredged material not only from the berthing areas for the container terminal but also material from the deepening of the channel and future maintenance material from the channel, including the existing turning basin. The DMMP includes an environmental opportunity through the utilization of dredged material beneficially. Approximately 1,000 acres of emergent marsh would be created adjacent to the project.

During the reevaluation of the Federal project it was determined that the EIS developed for the container terminal permit contained applicable environmental material that related to the current recommended plan. The related information is incorporated into the GRR by reference. In addition, since the DMMP developed for the permit satisfies Federal project requirements, it was adopted for the current Federal project plan with minor modifications.

Copies of the draft GRR and EA and the Shoal Point Container Terminal EIS can be downloaded from the US Army Corps of Engineers, Galveston District website at http://www.swg.usace.army.mil/, or a copy of the draft GRR and EA is available for review at the following public libraries:

Evelyn Meador Branch Library 2400 Meyer Road Seabrook, Texas	La Porte Public Library 526 San Jacinto St. La Porte, Texas	League City Library 100 West Walker St. League City, Texas
Sterling Municipal Library 1 Mary Wilbanks Ave. Baytown, Texas	Pasadena Public Library 4330 Fairmont Parkway Pasadena, Texas	La Marque City Library 1011 Bayou Road La Marque, Texas
Rosenberg Library 2310 Sealy St. Galveston, Texas	Moore Memorial Library 1701 9th Ave. North Texas City, Texas	Library Association 4324 HWY 3 Dickinson, Texas
Deer Park Library 3009 Center St. Deer Park, Texas		

A copy of the Texas City Channel Draft GRR and Supplemental EA, as well as a CD copy of the Shoal Point Container Terminal Environmental Impact Statement are available upon request. Requests and comments should be submitted to, Ms. Carolyn Murphy, Chief, Environmental Section (PE-PR), U.S. Army Corps of Engineers, 2000 Fort Point Road, Galveston, Texas 77553 (carolyn.e.murphy@swg02.usace.army.mil). Comments should be submitted by February 16, 2007.

Sincerely,

Richard Medina

Richard Medina
Chief, Planning and Environmental Branch

U.S. Environmental Protection Agency
Michael P. Jansky, P.E.
1445 Ross Ave. (6EN-XP)
Dallas, Texas 75202-2733

U.S. Environmental Protection Agency
Barbara Keeler
1445 Ross Ave. (6WQ-EM)
Dallas, Texas 75202-2733

U.S. Environmental Protection Agency
Jahanbakhsh Behnam
1445 Ross Ave. (6PB-L)
Dallas, Texa 75202-2733

Douglas M. Hoover
Executive Director Management Services
City of Texas City
1801 9th Avenue North
Texas City, Texas 77592-2608

Texas City International Terminal
Alex Parkman
928 5th Avenue North
Texas City, Texas 77590

National Marine Fisheries Service
Rusty Swafford
4700 Avenue U
Galveston, Texas 77551

National Marine Fisheries Service
Andreas Major, Jr.
9721 Executive Center Drive North
St. Petersburg, Florida 33702

U.S. Fish and Wildlife Service
Moni Belton
17629 El Camino Real
Suite 211
Houston, Texas 77058

U.S. Fish and Wildlife Service
Brian Cain
17629 El Camino Real
Suite 211
Houston, Texas 77058

Federal Highways Administration
Texas Division
Gary Johnson
300 East Eight Street, Room 826
Austin, Texas 78701

Federal Emergency Management Agency
Sherri Waineright
Region VI
Federal Regional Center
800 North Loop 288
Denton, Texas 76209-3698

Commander, U.S. Coast Guard
VTS Houston/Galveston
9640 Clinton Drive
Houston, Texas 77029

Commander, U.S. Coast Guard
Marine Safety Office
P.O. Box 0149
Galveston, Texas 77553-0149

Texas Parks and Wildlife Department
Sherri O'Brien
1322 Space Park Drive
Suite B 180
Houston, Texas 77058

Texas Parks and Wildlife Department
Resource Protection
Larry McKinney
4200 Smith School Road
Austin, Texas 78744

Texas Department of Transportation
Houston, District, 7721
Hassan Nikooei
P.O. Box 1386
Houston, Texas 77251-1386

Texas General Land Office
Garry D. McMahan
Regional Manager Asset Inspections-Upper Coast
11811 North D. Street
La Porte, Texas 77571-9135

Texas General Land Office
Coastal Leasing Division
Anthony Williams
Stephen F. Austin Building
1700 North Congress Avenue
Austin, Texas 78701-1495

Coastal Coordination Council
Mr. Tom Calnan
1700 North Congress Avenue
Austin, Texas 78701-1495

Texas Commission on Environmental Quality
P.O. Box 13087
Mark Fisher (MC 105)
Austin, Texas 78711-3087

Texas Commission on Environmental Quality
P.O. Box 13087
Theresa Pella (MC 163)
Austin, Texas 78711-3087

Texas Commission on Environmental Quality
P.O. Box 13087
Emily Barrett (MC 163)
Austin, Texas 78711-3087

Texas Railroad Commission
Commissioner Michael Williams
P.O. Box 12967
Austin, Texas 78711-2967

Texas State Historical Commission
Deputy State Historic Preservation Officer
P.O. Box 12276
Austin, Texas 78711-2276

Houston-Galveston Area Council
P.O. Box 22777
3555 Timmons Lane, Suite 500
Houston, Texas 77227-2777

Port of Texas City
Texas City Terminal Railway Company
J.B. (Bill) Mathis
President and Executive Director
2425 SH 146 North
Texas City, Texas 77592-0591

Port of Galveston
Port Director
P.O. Box 328
Galveston, Texas 77553

Port of Houston Authority
P.O. Box 2562
Houston, Texas 77252-2562

Galveston County Health District
Ronald B. Schultz, Jr.
Pollution Control Director
P.O. Box 939
La Marque, Texas 77568

City of Galveston City Hall
Steve Leblanc
City Manager
P.O. Box 779
Galveston, Texas 77553

City of La Marque
City Manager
1111 Bayou Road
La Marque, Texas 77568

Village of Bayou Vista
City Secretary
2929 HWY 6, Suite 100
Bayou Vista, Texas 77563

Seabrook City Hall
City Manager
1st Street
Seabrook, Texas 77586

Shoreacres City Hall
601 Shore Acres Blvd.
La Porte, Texas 77571

Taylor Lake Village
500 Kirby Road
Seabrook, Texas 77586-5298

City of El Lago
98 Lakeshore Drive
El Lago, Texas 77586

Pasadena City Hall
1211 Southmore Avenue
Pasadena, Texas 77502

Beach City, City Office
12723 Tri City Beach Road
Baytown, Texas 77520

Baytown City Hall
2401 Market Street
Baytown, Texas 77520

La Porte City Hall
604 W. Fairmont Parkway
La Porte, Texas 77571

League City City Hall
300 W. Walker Street
League City, Texas 77573

Morgans Point City Hall
Lance Avante
City Administrator
1415 E. Main Street
La Porte, Texas 77572-0839

City of Houston
Mayor
P.O. Box 1562
Houston, Texas 77251

Galveston/Texas City Pilots
P.O. Box 16110
Galveston, Texas 77552

Houston Pilots
906 Harborside Dr.
Galveston, Texas 77550

Kirby Corporation
Les Sutton
55 Waugh Drive, Suite 1000
Houston, Texas 77251

BP/Amoco
Vic H. Venturini
Asset Superintendent
2401 5ht Ave. South
Texas City, Texas 77592

BP/Amoco
Port Superintendent
2401 5th Avenue South
P.O. Box 2991
Texas City, Texas 77592-2991

Sterling Chemicals
Supply Chain Supervisor
P.O. Box 1311
Texas City, Texas 77592-1311

TEPPCO
K. Larry Patton
Manager, Business Development
TEPPCO Crude Pipeline, L.P.
3418 Brookhaven Drive
Montgomery, Texas 77356

Dow Chemical
1109 11-1/2 St. North
Texas City, Texas 77590

Marathon Oil
8150 South Loop East
Houston, Texas 77107

Valero Refining Company
Supply & Distribution Manager
1301 Loop 197 South
Texas City, Texas 77592-3429

Galveston Bay Foundation
17324-A Highway 3
Webster, Texas 77598

Scenic Galveston
Evangeline Whorton
20 Colony Park Circle
Galveston, Texas 77551

Houston Audubon Society
440 Wilchester
Houston, Texas 77079

Galveston Bay Conservation
And Preservation Association
P.O. Box 323
Seabrook, Texas 77586

Galveston Bay National Estuary Program
Bay Plaza 1
711 West Bay Area Boulevard, #210
Webster, Texas 77598

Omega Bay
Russell Kiesling
19 N. White Heron
La Marque, Texas 77568

Houston Yacht Club
Ross Tuckwiller
3620 Miramar
La Porte, Texas 77571

Evelyn Meador Branch Library
2400 Meyer Road
Seabrook, Texas 77586

Laporte Public Library
526 San Jacinto St.
La Porte, Texas 77571

League City Library
100 West Walker St.
League City, Texas 77573

Sterling Municipal Library
1 Mary Wilbanks Ave.
Baytown, Texas 77520

Pasadena Public Library
4330 Fairmont Parkway
Pasadena, Texas 77504

La Marque City Library
1011 Bayou Road
La Marque, Texas 77568

Rosenberg Library
2310 Sealy St.
Galveston, Texas 77550

Moore Memorial Library
1701 9th Ave. North
Texas City, Texas 77590

Library Association
4324 Hwy 3
Dickinson, Texas 77539

Deer Park Library
3009 Center St.
Deer Park, Texas 7753

Ms. Beryl Battiste
Alabama-Coushatta Tribe of Texas
571 State Park Road 56
Livingston, Texas 77351

Ms. Augustine Asbury
Alabama-Quassarte Tribal Town
P.O. Box 187
Wetumka, Oklahoma 74883

Mr. Robert Cast
Tribal Historic Preservation Officer
Caddo Indian Tribe of Oklahoma
P.O. Box 487
Binger, Oklahoma 73009

Dr. Richard L. Allen
Cherokee Nation of Oklahoma
P.O. Box 948
Talequah, Oklahoma 74465

Ms. Gingy Nail
Chickasaw Nation
P.O. Box 1548
Ada, Oklahoma 74821

Mr. Terry Cole
Tribal Historic Preservation Officer
Choctaw Nation of Oklahoma
P.O. Drawer 1210
Durant, Oklahoma 74702-1210

Mr. Michael Burgess
Tribal Administrator
Comanche Indian Tribe
P.O. Box 908
Lawton, Oklahoma 73502

Ms. Tamara Francis
NAGPRA Coordinator
Delaware Tribe of Western Oklahoma
P.O. Box 825
Anardo, OK 73005

Mr. Juan Garza
Kickapoo Traditional Tribe of Texas
HC 1 Box 9700
Eagle Pass, Texas 78852

Reverend George Daingkau
NAGPRA Coordinator
Kiowa Tribe of Oklahoma
118 South Stevens
Hobart, Oklahoma 73651

Ms. Holly Houghten Jr.
Interim Tribal Historic Preservation Officer
Mescalero Apache Tribe
P.O. Box 227
Mescalero, NM 88340

Mr. Anthony Street
Tonkawa Tribe of Indians of Oklahoma
1 Rush Buffalo Road
Tonkawa, Oklahoma 74653-4449

Mr. Earl Barby, Jr.
Tribal Historic Preservation Officer
Tunica-Biloxi Indian Tribe of Louisiana
P.O. Box 331
Marksville, Louisiana 71351

Mr. Stratford Williams
Vice President
Wichita and Affiliated Tribes
P.O. Box 729
Anadarko, OK 73005

Choctaw Nation of Oklahoma
Historic Preservation
P.O. Box 1210 ~ Durant, OK 74702-1210
1-580-924-8280 ~ 1-800-522-6170 ~ Fax 1-580-920-3181

Gregory E. Pyle
Chief

Mike Bailey
Assistant Chief

February 14, 2007

Department of the Army
Corps of Engineers
Richard Medina
P.O. Box 1229
Galveston, Texas 77553-1229

Dear Richard Medina

We have reviewed the following proposed project (s) as to its effect regarding religious and/or cultural significance to historic properties that may be affected by an undertaking of the projects area of potential effect.

Services Requested: Texas City Channel Deepening Project

Town & State: Galveston County, Texas

Comments: After further review of the above mentioned project (s), it has come to our attention that this project is **out of our area of interest**. However, should construction expose buried archaeological or building materials such as chipped stone, tools, pottery, bone, historic crockery, glass or metal items, this office should be contacted immediately @ 1-800-522-6170 ext. 2137.

Sincerely,

Terry D. Cole
Tribal Historic Preservation Officer
Choctaw Nation of Oklahoma

By: Caren A. Johnson
Caren A. Johnson
Administrative Assistant

Appendix G
List of References

APPENDIX G

References

Enright, J.J. and J.M. Enright and R.L. Gearhart II and D.S. Jones
2005 Diving Assessment of Two Anomalies for Historic Properties Investigations, Texas City Channel Improvements Project, Galveston County, Galveston Bay, Texas. Prepared for USACE, Galveston District

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Appendix H
HQUSACE Economic Guidance

For CE only

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

CEMP-SWD 27 FEB 2006

MEMORANDUM FOR Commander, Southwestern Division (CESWD-PDS-P)

SUBJECT: Request for Waiver from Economic Guidance Memorandum 05-01 for the Sabine-Neches Waterway Feasibility and Texas City Channel Limited Reevaluation Studies

1. Reference: CESWG-PE memorandum dated 21 November 2005, subject: Request For Waiver From Economic Guidance Memorandum 05-01 for the Sabine-Neches Waterway Feasibility and Texas City Channel Limited Reevaluation Studies.

2. This memorandum provides a formal response to reference 1.a. above, which requested waiver from EGM 05-01 for the Sabine-Neches Waterway Feasibility and the Texas City Channel Limited Reevaluation Studies in the Memorandum for the Commander dated 21 November 2005. CECW-CP provided guidance by e-mail dated 14 December 2005 to facilitate the District's adherence to the study schedule.

3. The request for a waiver regarding application of deep-draft vessel operating costs as forwarded by the Galveston District is not approved. The request for the waiver is based on the concern over the recent spread of fuel or bunkerage prices between what is estimated for dredge plant operation versus cargo vessel operation. HQUSACE, with assistance from the Institute of Water Resources (IWR), is continuing to discuss the various cost estimating practices and the approaches that may be required when the prices of fuel (or other commodities, such as steel) are highly fluctuating. Additional guidance will be forthcoming at the conclusion of those discussions.

4. Enclosed, please find additional information to clarify the HQUSACE response to the district waiver request, and an interim approach for the district to use in advance of formal guidance. IWR completed interim economic analyses to develop a price adjustment that would be applicable to existing estimates of inland vessel bunkerage costs for approximation of deep-draft or coastal dredge plant costs. The analyses yielded an estimate of $1.119 per standard gallon (MDO or higher-level distillates). This estimated value of dredge bunkerage costs will apply to the NED economic analysis of navigation projects until revised, superseded, or otherwise directed by HQUSACE. However, the cost estimator still needs to apply current market costs, as is their usual practice, for the development of the fully funded project cost estimate. If you have additional questions, please request a telephone conference to discuss in more detail.

FOR THE COMMANDER:

Patricia A. Rivers

Encl

PATRICIA A. RIVERS, P.E.
Chief, Southwestern Division
Regional Integration Team
Directorate of Military Programs

CEMP-SWD 16 February 2006

Sabine-Neches Waterway Feasibility and Texas City Channel Limited Reevaluation Studies

Request for Waiver from Economic Guidance Memorandum 05-01

1. Additional Information to Clarify HQUSACE Response to District Waiver Request.

a. Currently, for purposes of economic analysis, estimation of fuel costs for dredge plant operation relies upon immediate-term or current spot market prices. The estimation of fuel costs for cargo vessel operations is based on a five-year moving average. The differing approaches to estimation are based on the assumption or principle that dredge plant costs are expected to be incurred in the relative near future, when a justified project is constructed, while cargo vessel operations costs are expected to be incurred during the project economic life (normally 50 years). In the latter case, the moving average is intended to smooth or reduce short-term or temporary spikes or market fluctuations in bunker costs for constant dollar price estimates applied for present valuation of project benefit streams over the project economic life.

b. Based on this logic, dredge plant and cargo vessel bunkerage costs will almost certainly be different but the margin between estimates is usually not so pronounced as with the volatility exhibited in the energy markets over the past year. In addition to short-run versus long run considerations, there are other factors that cause dredge plant fuel costs to differ from that paid by deep-draft carriers. Domestic dredges have limited sources of supply and purchase fuel in smaller allotments. These often cause dredge fuel prices to exceed those charged deep-draft carriers.

c. The rationale for the five-year moving average as applied for deep-draft cargo carriers is based in large part on combined consideration of both domestic and international business cycles, in addition to cycles of asset turnover in deep-draft transportation markets. A review of inland vessel fuel prices indicates that fuel prices paid by inland vessels is more comparable to those paid by dredges than those paid by deep-draft carriers for the reasons cited above. However, the potential issue concerning taxes or related surcharges levied on inland vessel fuel purchases or fuel for vessels supported by the inland waterway system versus dredge plant will need to be further researched. A four-year moving average is used to estimate inland vessel bunkerage costs.

d. The recommended approach for economic analysis, in lieu of the waiver, is to use deep draft vessel operating costs as published in EGM 05-01 for benefit estimates and to use a four-year moving average for dredging plant fuel cost estimates.

e. As a result of this waiver request, the Institute for Water Resources completed basic research and analysis to develop a price adjustment applicable to existing estimates of inland vessel bunkerage costs for approximation of deep-draft or coastal dredge plant costs. Available data and information was compiled from cost estimators at those USACE Districts that monitor dredge plant costs and from representatives of the industry. The information provided from these sources was combined to develop an approximate ratio or proportion of dredge plant fuel costs versus typical inland tug fleet fuel costs, as developed for the current release of inland\shallow draft vessel operating costs (EGM 05-06).

f. Based on the information obtained relative to moving average period, price level and scale of purchase, the estimated adjustment is 96 percent of the $1.166 per standard gallon, as listed in the inland\shallow draft EGM. This yields an estimated $1.119 per standard gallon and is considered applicable for estimation of dredge bunkerage costs. This value is considered applicable to NED economic analysis of navigation projects until revised, superseded, or otherwise directed by HQUSACE. This estimate is for price comparability within the framework of NED economic studies and is not appropriate for the estimation of fully-funded estimates.

2. Interim Guidance to Move Ahead.

a. Procedure. The procedure that the Galveston cost estimator will need to follow in the "study" phases of the project does require preparation of a cost estimate for the economic analysis and later on, a separate estimate for the fully funded project costs. (Eventually a third cost estimate, the government estimate for the bid opening, would be prepared but that is much further down the road.) Use of the software programs, CEDEP and MCACES, should make preparation of the estimates required for these various stages manageable.

b. Economic Analysis. As a result of the waiver request, IWR completed interim analyses to develop a price adjustment that would be applicable to existing estimates of inland vessel bunkerage costs for approximation of deep-draft or coastal dredge plant costs. The analyses yielded an estimate of $1.119 per standard gallon (MDO or higher-level distillates). This estimated value of dredge bunkerage costs will apply to the NED economic analysis of navigation projects until revised, superseded, or otherwise directed by HQUSACE. The value becomes input data to the CEDEP program (the products of which are in turn applied to MCACES) to derive a project cost estimate for the economic analysis.

c. Fully-Funded Estimate. The cost estimator still needs to apply current market costs, as is their usual practice, for the development of the fully funded project cost estimate.

Texas City Channel Deepening Project
General Reevaluation Report and
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Appendix I
Biological Assessment

- Biological Assessment for Federally-Listed Threatened and Endangered Species including supporting correspondence from USFWS and NMFS
- February 7, 2006 Correspondence to NMFS

BIOLOGICAL ASSESSMENT FOR FEDERALLY-LISTED THREATENED AND ENDANGERED SPECIES

TEXAS CITY CHANNEL DEEPENING PROJECT, GALVESTON COUNTY, TEXAS GENERAL REEVALUATION REPORT AND ENVIRONMENTAL ASSESSMENT

1. Previous Coordination. The Shoal Point Container Terminal Project (Shoal Point Project) was permitted by the U. S. Army Corps of Engineers (USACE) (Permit No. 21979) with the signing of the Record of Decision on April 14, 2003. Project features were coordinated with the resource agencies. These approved features include deepening the Texas City Channel (TCC) and Turning Basin to 45 feet, construction of three leveed dredged material placement areas with divided cells, one beach nourishment placement area, and dredging berthing docks at Shoal Point. The current Draft General Reevaluation Report (GRR) and Environmental Assessment (EA) detail the proposed Federal construction of the channel portion of the Shoal Point Project, and a summary of this information is presented below.

The United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) provided comments during the Shoal Point Project study and for the draft Environmental Impact Statement (EIS). These comments were addressed in the Final EIS and the Record of Decision. In addition, coordination with USFWS and NMFS was undertaken for the preparation of the current EA for the Federal construction project. Copies of USFWS and NMFS correspondence pertaining to Endangered Species Act coordination of both the EIS and the current EA are attached to this document. It should be noted that this Biological Assessment (BA) was structured to respond to specific comments from NMFS in their March 16, 2006 correspondence, but has been compiled to document and address all threatened and endangered species in the project area.

2. Description of the Proposed Texas City Channel Deepening Project. The Federal Texas City Channel Deepening Project (Federal Project) proposes to deepen the existing 40-foot TCC and Turning Basin to a depth of 45 feet. This project is expected to be completed using a hydraulic cutterhead dredge. Dredged material would be beneficially used to construct confined areas for dredged maintenance material adjacent to Shoal Point and Pelican Island. After the areas have reached a predetermined target elevation, the areas will be contoured, planted and shaped to form approximately 999 acres of emergent marsh that are expected to benefit the production of fish and wildlife habitat. Sand dredged from the existing TCC is proposed for placement on the north side of the Texas City Dike (Dike). Two, 500-foot long armored groins will be constructed from new work material from a channel bend easing area to aid in reduction of longshore transport of sand back into the TCC. With the exception of the two armored groins for the Federal project and dredging the berths for the Shoal Point Project, the two projects are essentially the same. The affected environment and project related environmental impacts addressed in the Shoal Point Project EIS have been incorporated by reference into the Draft GRR and EA for the Federal Project.

2.a. Expected start and end dates. Construction is scheduled to begin in 2008 and will be phased over a two year period if funds are appropriated.

2.b. Construction methods to be utilized. Deepening the channel and Turning Basin will be accomplished by hydraulic cutterhead dredge. Dredged material will be pumped by pipeline into designated placement areas (PA). Levees for new PAs and groins will be constructed hydraulically with dredged new-work material, with final shaping using dozers and track hoes. Riprap will be placed on the groins with the use of shallow draft barges, dragline and excavators.

2.c. A description of the entire action area. The proposed project is located on the upper Texas coast in the southwestern corner of Galveston Bay, between the northeast end of Galveston Island and the City of Texas City. The TCC extends through lower Galveston Bay in a westerly-northwesterly direction from its intersection with Bolivar Roads to the Turning Basin at the Port of Texas City (Figure 1). Galveston Bay is a shallow estuary approximately 600 square miles in surface area with typical water depths ranging from 5 to 12 feet. Dredged navigation channels, with depths ranging from 12 to 45 feet, transect the bay system. An important feature in the bay system is the

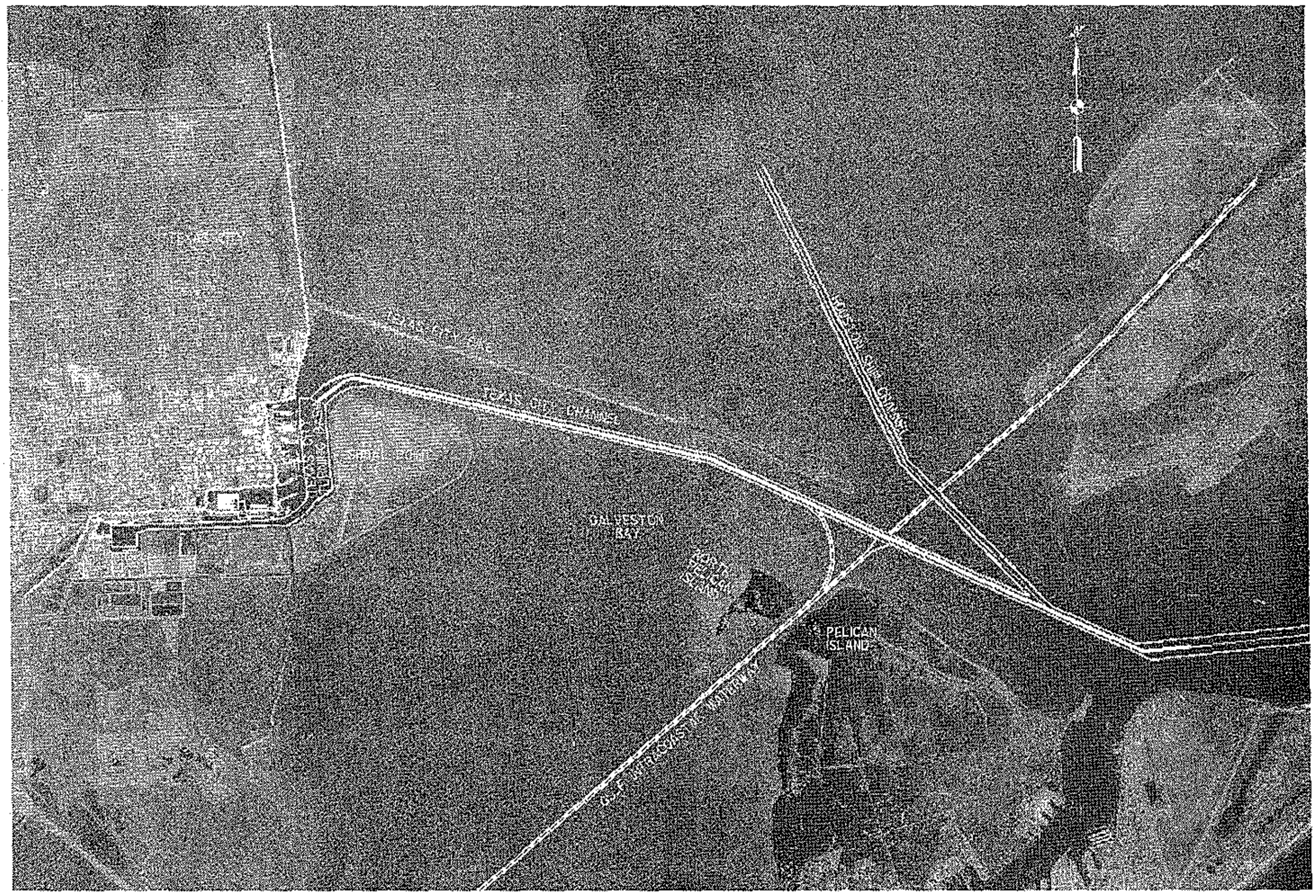


Figure 1. Project area including the Texas City Channel, Turning Basin, Texas City Dike, Shoal Point, and Pelican Island.

Dike along the west shore of Galveston Bay. This structure, which has existed in the bay system in various forms since 1915, exerts an influence on the currents in the Bolivar Roads area and reduces the exchange of water between Galveston Bay and West Bay. At the same time, it reduces currents and sedimentation in the TCC.

The Galveston Bay System provides important nursery habitat for numerous commercially and recreationally important estuarine-dependent fish and shellfish species, as well as providing habitat for marine mammals, reptiles, resident birds, wintering waterfowl, shorebirds and other avian species. The open-bay habitat is the water column and the species that inhabit the water column. Galveston Bay, the largest bay system in Texas, has the highest primary productivity of all Texas bays. Phytoplankton are the primary producers of the bay. They take up carbon by photosynthesis and pass it through the food chain to zooplankton, the primary consumers. Zooplankton, the basis of the food chain for larval and juvenile fish, are limited by turbidity and currents which can carry them out to sea, away from concentrated phytoplankton food mass in the bay.

Estuarine dependent species include the brown shrimp, white shrimp, Gulf menhaden, blue crab, sand sea trout and hardhead catfish. Newly spawned fish and shellfish begin migrating into the bay in winter and early spring, with maximum biomass observed during the summer months. Shrimp utilize the open-bay bottom as nursery habitat from spring through fall and then migrate to the Gulf.

The second largest habitat in the Galveston Bay system is the open-bay bottom. Open-bay bottom includes bay bottom habitat that is not covered with seagrasses or oyster reefs. Anthropogenic habitats include dredged channels, dredged material PAs, bulkheads and jetties. Over the last 100 years the open-bay bottom has increased in size due to subsidence, dredging, and loss of seagrasses.

Epifauna and infauna inhabit the open-bay bottom. Epifauna such as crabs and smaller crustaceans live on the surface of the bottom substrate, and infauna such as mollusks and polychaetes burrow into the bottom substrate. Many of the epifauna and infauna feed on plankton and are then fed upon by numerous fish species and birds. One of the most important components of the open-bay bottom habitat is vast mud and sand flats where large quantities of nutrients and food resources are contributed to the system.

Submerged aquatic vegetation can be found along the shorelines in soft sediments. These seagrass communities generate high primary productivity, provide refuge for numerous organisms and serve as spawning and nursery grounds for many finfish and shellfish species. However, there are no true seagrasses in the project area. Emergent vegetation is located in areas around Shoal Point, but the proposed project will not affect these areas.

2.d. The boundaries of the action area. Action area boundaries to the north are the Dike and placement areas on the north side of the Dike, Pelican Island and Bolivar Roads on the east, Shoal Point and West Bay on the south, and the Port of Texas City on the west.

2.e. The baseline conditions in the action area.

Surface Water Quality and Hydrology. Total suspended solids values in the Galveston Bay system are generally higher near points of inflow, such as the Trinity or San Jacinto Rivers, and lower toward the open-bay system (Ward and Armstrong, 1992). Background total suspended solids in the bay are generally below 100 mg/L. The TCC is a dead-end channel without a natural source of freshwater inflow other than rainfall runoff.

Galveston Bay sediments are a mixture of fine sands, clays, and silts. A general sediment quality trend was identified for concentrations of metals and commonly measured organic compounds, which generally tend to be elevated near regions of runoff, inflow and waste discharges. Lower, more uniform concentrations exist in the open bay.

The TCC is identified as Water Quality Segment 2437 by the Texas Commission on Environmental Quality (TCEQ) and has designated uses of High Quality Aquatic Habitat and Non-Contact Recreation. The salinity data in the TCC Segment is slightly higher than the Lower Galveston Bay Segment, and dissolved oxygen is slightly lower.
Waters adjacent to Pelican Island are part of TCEQ's Lower Galveston Bay Segment 2439. The designated uses for segment 2439, Lower Galveston Bay, are Contact Recreation, High Quality Aquatic Life Use, and Oyster Habitat. Salinity of this segment has a large range, but its average is close to half that of sea water. Although the total suspended solids can be high, it averages only 32 mg/L. Also, the coliform bacteria level is well below 200 colony-forming units per deciliter, which is the criterion for contact recreation use.

Aquatic Ecology. The Galveston Bay system provides important nursery habitat for numerous commercially and recreationally important estuarine-dependent fish and shellfish species, as well as providing habitat for marine mammals, reptiles, resident birds, wintering waterfowl, shorebirds, and other avian species.

Essential Fish Habitat. The Federal Project is located in an area that has been identified by the Gulf of Mexico Fishery Management Council (GMFMC) as Essential Fish Habitat (EFH) for adult and juvenile brown and white shrimp, red drum, and Spanish mackerel. The preferred habitat, life history stages, and relative abundance of each EFH managed species is described in detail in Section 3.14.8 of the Shoal Point Project EIS and is incorporated by reference.

Threatened and Endangered Species. Table 1, below, lists the threatened (T) and endangered (E) species, species proposed for listing (P), species of concern (SOC), and designated critical habitat (CH) under the jurisdiction of USFWS and NMFS for Galveston County that were identified by the Services as potentially present in the Federal Project area. Species potentially present in Harris and Chambers Counties, and those identified by Texas Parks and Wildlife Department, may be found in the EIS and are incorporated by reference into this document.

Table 1: Threatened and Endangered Species Status

Common Name	Scientific Name	Status	Jurisdiction
PLANTS			
Texas windmill-grass	*Chloris texensis*	SOC	USFWS
Houston machaeranthera	*Machaeranthera aurea*	SOC	USFWS
BIRDS			
Attwater's greater prairie-chicken	*Tympanuchus cupido attwateri*	E	USFWS
brown pelican	*Pelecanus occidentalis*	E	USWFS
piping plover	*Charadrius melodus*	T; CH	USFWS
southeastern snowy plover	*Charadrius alexandrinus tenuirostris*	SOC	USFWS
reddish egret	*Egretta rufescens*	SOC	USFWS
MARINE MAMMALS			
blue whale	*Balaenoptera musculus*	E	NMFS
finback whale	*Balaenoptera physalus*	E	NMFS
humpback whale	*Megaptera novaengliae*	E	NMFS
sei whale	*Balaenoptera borealis*	E	NMFS
sperm whale	*Physeter macrocephalus*	E	NMFS
TURTLES			
Texas diamondback terrapin	*Malaclemys terrapin littoralis*	SOC	USFWS
green sea turtle	*Chelonia mydas*	T	NMFS USFWS
hawksbill sea turtle	*Eretmochelys imbricata*	T	NMFS
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	NMFS USFWS
leatherback sea turtle	*Dermochelys coriacea*	E	NMFS
loggerhead sea turtle	*Caretta caretta*	T	NMFS USFWS
FISH			
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T	NMFS
dusky shark	*Carcharhinus signatus*	SOC	NMFS
Goliath grouper	*Epinephelus itajara*	SOC	NMFS
largetooth sawfish	*Pristis pristis*	SOC	NMFS
smalltooth sawfish	*Pristis pectinata*	E	NMFS
night shark	*Carcharhinus signatus*	SOC	NMFS
saltmarsh topminnow	*Fundulus jenkinsi*	SOC	NMFS
sand tiger shark	*Odontaspis taurus*	SOC	NMFS
speckled hind	*Epinephelus drummondhayi*	SOC	NMFS
Warsaw grouper	*Epinephelus nigritus*	SOC	NMFS
white merlin	*Tetrapturus albidus*	SOC	NMFS

Table 1 (con't): Threatened and Endangered Species Status

INVERTEBRATES			
elkhorn coral	*Acropora palmata*	P	NMFS
ivory bush coral	*Oculina varicosa*	SOC	NMFS
staghorn coral	*Acropora cervicornis*	P	NMFS

Species descriptions.

Texas windmill grass. This grass is found in sandy to sandy loam soils in open to sometimes barren areas in prairies and grasslands, including ditches and roadsides. It is not expected in the project area due to absence of suitable habitat.

Houston machaeranthera. A member of the Asteraceae, this plant is endemic to the Houston area. It is an annual, tap-rooted forb that blooms from October to November that occurs in seasonally wet, saline areas around the base of mima mounds and barren or sparsely vegetated grasslands, disturbed pastures and roadsides on sandy loam soils, specifically Clodine, Gessner and Hockley series. This plan is not expected in the project area due to the absence of suitable habitat.

Attwater's greater prairie-chicken. The Attwater's greater prairie-chicken is a ground-dwelling grouse of the coastal prairie ecosystem that was formerly abundant in parts of the coastal prairie of Texas, including Galveston County. One of the most endangered birds in Texas, the Attwater's greater prairie-chicken does not occur in the Federal Project area due to lack of suitable habitat and will not be affected by the project.

Brown pelican. The brown pelican is a common bird of Texas coastal and near-shore areas and they occur in the Federal Project area. Loafing brown pelicans are common in the project area. In addition, Brown pelicans nest on Pelican Spit near areas of proposed construction. The Pelican Island PA is located about one-half mile south of Pelican Spit, and construction of this beneficial use site will not impact nesting birds. Loafing habitat may become less attractive during construction because of increased noise and human activity, but will not be destroyed. In fact, construction of the proposed PAs and beach nourishment may increase opportunities for loafing.

Piping plover. The northern Great Plans and Great Lakes populations of piping plover migrate along the Texas coast from fall through spring, and feed in moist sand along beaches and sand-mud flats around inlets and estuaries. The major portion of the two populations now winters along North and South Padre Island and Bolivar Flats in Texas. The nearest designated critical habitat units are TX-34 located on west Galveston Island and TX-36, located on Bolivar Beach, approximately 20 miles and 10 miles, respectively, from the project area. Piping plovers can occasionally be seen in the general vicinity of the proposed project, but these are transitory occurrences. No suitable habitat exists for this species in the project area, and no project impacts are expected.

Southwestern snowy plover. This bird is an uncommon summer resident along the Texas coast as far north as Galveston County. It is of rare occurrence during the winter, except around Galveston

Bay where it is uncommon. It is a rare to uncommon migrant throughout the state and a rare to uncommon resident in northern Texas. The snowy plover primarily inhabits unvegetated beaches and coastal flats. However, it is also attracted to barren shores associated with large inland alkaline, saline, and freshwater lakes. This species is not expected in the project area due to a general absence of suitable habitat.

Reddish egret. The reddish egret is a common resident along the Texas coast. This species inhabits saline and freshwater habitats in all coastal counties, although it is more numerous southward. It forages in brackish marshes, shallow salt ponds, and tidal flats and nests on the ground, in trees or bushes, or in brushy thickets of yucca and prickly pear on dry coastal islands. This species may occur in the project area, but was not observed during the field survey conducted for the EIS. Project construction will potentially increase this species' habitat. Possible disturbance of the reddish egret by construction will be temporary and of minimal impact.

Blue whale. The distribution of the blue whale in the western North Atlantic generally extends from the Arctic to at least mid-latitude waters, where it migrates to feeding grounds in the spring and summer after wintering in subtropical and tropical waters. The blue whale is best considered as an occasional visitor along the U.S. Atlantic coast, which may represent the current southern limit of its feeding. Records suggested an occurrence of this species south to Florida and the Gulf of Mexico, although the actual southern limit of the species' range is unknown. Galveston Bay is too shallow to provide suitable habitat for whales and they are not expected to be present in the project area.

Finback whale. These whales are common in waters of the U.S. Atlantic coast from Cape Hatteras northward. In addition, sightings in the north-central Gulf of Mexico confirm their presence in the Gulf throughout the year. Finback whales feed mainly on pelagic crustaceans and fish and are known to come close to shore in pursuit of fish along the New England coast. No sightings or records of finback whales are known to occur in the nearshore waters near the project area in the northwestern Gulf of Mexico. Galveston Bay is too shallow to provide suitable habitat for whales and they are not expected to be present in the project area.

Humpback whale. These whales occur in all oceans. In the western north Atlantic they migrate between their summer feeding grounds off Cape Cod to their winter calving and breeding grounds in the Caribbean. A total of four sightings and five captures in the Gulf of Mexico were reported, with the only recorded humpback whale sighting in Texas occurring off Galveston Island. Galveston Bay is too shallow to provide suitable habitat for whales and they are not expected to be present in the project area.

Sei whale. Often found in deeper waters, sei whales occur in all oceans, but are rare in tropical or polar seas. They are widely distributed in nearshore waters of the North Atlantic from the Gulf of Mexico and the Caribbean Sea to Nova Scotia and Newfoundland. Their occurrence in the Gulf of Mexico is limited to strandings from Campeche, Mexico, Mississippi and Louisiana, and to one probable at-sea sighting. There is no record of their occurrence in the nearshore waters of Galveston Island, and Galveston Bay is too shallow to provide suitable habitat for whales and they are not expected to be present in the project area.

Sperm whale. These whales are found throughout the world's oceans in deep waters to the edge of the ice at both poles. Although at least four sperm whale strandings have been recorded along the beaches of South Padre Island, their normal range is limited to the deeper waters beyond the continental shelf where they forage for squid and other deepwater species. Galveston Bay is too shallow to provide suitable habitat for whales and they are not expected to be present in the project area.

Texas diamondback terrapin. This terrapin prefers coastal marshes, tidal flats, coves, estuaries, and lagoons behind barrier beaches. It is also found in brackish and salt water. It burrows into mud when inactive and may venture into lowlands at high tide. This species may be present in the project area, but impacts resulting from the proposed Federal Project are highly unlikely. Marsh creation will increase habitat for this species.

Green sea turtle. The green sea turtle was historically the most abundant sea turtle in Texas. Over fishing brought about a rapid decline, although this species can still be found on the seagrass meadows of the lower Laguna Madre. This species is most likely to occur in the southern bays of Texas where clear water and seagrass and algal beds are more abundant. It is not likely to occur along the upper Texas coast or in the project area. If present, this turtle could be impacted by dredging activities.

Hawksbill sea turtle. This turtle is extremely rare in Texas coastal waters and is not expected to be present in the project area.

Kemp's ridley sea turtle. The Kemp's ridley sea turtle migrates along the coast of Texas and is probably the most common sea turtle in Texas bays. It frequently enters bays to feed on shrimp, crab, and other invertebrates. It is found in Galveston Bay and has begun nesting on Galveston Island. Dredging activities could impact this species.

Leatherback sea turtle. The leatherback turtle is rare along the Texas coast. It is a pelagic species that tends to keep to deeper offshore waters where it feeds primarily on jellyfish. There are no known aggregation sites or feeding areas in the project area and the species is not expected to be present.

Loggerhead sea turtle. The loggerhead sea turtle frequents the temperate waters of the continental shelf along the Atlantic coast and Gulf of Mexico, where it forages around rocks, coral reefs, and shellfish beds. Sub-adults will also commonly enter Texas bays, lagoons, and estuaries. A loggerhead has been sighted in the Bolivar Roads area in Galveston Bay. If present, this turtle could be impacted by dredging activities.

Gulf sturgeon. The Gulf sturgeon, also known as the Gulf of Mexico sturgeon, is a subspecies of the Atlantic sturgeon. Gulf sturgeons are anadromous, but most adult feeding takes place in the Gulf of Mexico and its estuaries. The fish return to breed in the river system in which they hatched. Spawning occurs in areas of deeper water with clean rock and rubble bottoms. River systems where the Gulf sturgeon are known to be viable today include the Mississippi, Pearl, Escambia, Yellow, Choctawhatchee, Apalachicola, and Suwannee Rivers, and possibly others. The likelihood of Gulf sturgeon being present in the project area is very low. Galveston Bay is not within the historical range for this species nor does suitable spawning habitat exist in any of the rivers along the upper Texas coast.

Dusky shark. The dusky shark is a large shark with a wide-ranging distribution in warm-temperate and tropical continental waters. It is coastal and pelagic in its distribution, where it occurs from the surf zone to well offshore. Habitat for this species does not exist in the project area.

Goliath grouper. This fish was historically found in tropical and subtropical waters of the Atlantic Ocean, both coasts of Florida, and from the Gulf of Mexico down to the coasts of Brazil and the Caribbean. Most adults are found in shallow waters, the deepest being about 150 feet. Historically, they were abundant in very shallow water, often associated with piers and jetties along the Florida Keys and the southwest coast of Florida. This fish spawns offshore, and when not spawning is dispersed along shallow reefs. The most likely threat to this species is heavy fishing pressure during spawning. Habitat for this species does not exist in the project area.

Largetooth sawfish. Largetooth sawfish are generally long lived (30 years), slow growing, and late-maturing, and they produce a small number of young, resulting in a very low intrinsic rate of population growth for this species. Sawfish are sluggish bottom-dwellers living in coastal, estuarine and marine waters. Prey items include benthic invertebrates and fish. Largetooth sawfish occur along the Texas coast and east into Florida waters, but reported occurrences are rare. This species may occur in the project area.

Smalltooth sawfish. The smalltooth sawfish inhabit shallow coastal waters of tropical seas and estuaries throughout the world. They are usually found in shallow waters very close to shore over muddy and sandy bottoms. They are often found in sheltered bays, on shallow banks, and in estuaries or river mouths. Although historically present from Texas to Florida, the current range of this species is limited to peninsular Florida, where they are only common in the Everglades region and at the southern tip of the state. This species is not expected to be present in the project area.

Night shark. The night shark is a deep-water shark reported in waters from Delaware south to Brazil, including the Gulf of Mexico. This shark is usually found at depths greater than 150-200 fathoms during the day and 100 fathoms at night. Habitat for this shark does not exist in the project area.

Saltmarsh topminnow. This fish is endemic to the north-central coast of the Gulf of Mexico from Galveston Bay eastward to western Florida. They tend to live in salt marshes and brackish water. This species requires shallow flooded marsh surfaces for breeding and feeding. Coastal erosion and loss of marsh is thought to be the greatest threat to this species. It is possible that this species occurs in the project vicinity. The proposed Federal Project will benefit this species through the creation of 999 acres of intertidal marsh.

Sand tiger shark. The sand tiger shark has a broad inshore distribution. In the western Atlantic, this shark occurs from the Gulf of Maine to Florida, in the northern Gulf of Mexico, in the Bahamas and in Bermuda. They are generally coastal, usually being found in the surf zone down to depths around 75 feet. They may also be found in shallow bays. They usually live near the bottom, but may be found throughout the water column. Their biggest threat is over fishing. Habitat for this species does not exist in the project area.

Speckled hind. The speckled hind inhabits warm, moderately deep waters from North Carolina to Cuba, including Bermuda, the Bahamas and the Gulf of Mexico. The preferred habitat is hard bottom reefs in depths ranging from 150 to 300 feet. Habitat for this species does not exist in the project area.

Warsaw grouper. The Warsaw grouper is a very large fish found in the deep-water reefs of the southeastern U.S. This fish ranges from North Carolina to the Florida Keys and throughout much of the Caribbean and Gulf of Mexico to the northern coast of South America. This species inhabits deepwater reefs on the continental shelf break in waters 350 to 650 feet deep. Habitat for this species does not exist in the project area.

White merlin. White merlin are found in offshore waters throughout the tropical and temperate Atlantic Ocean and adjacent seas. They prefer deep blue water over 100 meters deep. Habitat for this species does not exist in the project area.

Elkhorn coral. Elkhorn coral is found on coral reefs in southern Florida and the Bahamas, and throughout the Caribbean. Its northern limit is Biscayne National Park, Florida. This species is particularly susceptible to damage from sedimentation. The project area is not located within the historical range for this species, nor does suitable habitat exist in the project vicinity.

Ivory bush coral. Colonies of ivory bush coral are found to depths of 152 meters on substrates of limestone rubble, low-relief limestone outcrops, and high-relief, steeply sloping prominences. The project area is not located within the historical range for this species, nor does suitable habitat exist in the project vicinity.

Staghorn coral. Staghorn coral is found throughout the Florida Keys, the Bahamas, and the Caribbean islands. This coral occurs in the western Gulf of Mexico, but it is absent from U.S. waters in the Gulf of Mexico. The project area is not located within the historical range for this species, nor does suitable habitat exist in the project vicinity.

Land Use.

Shoal Point. Shoal Point lies within the corporate limits of Texas City on Shoal Point peninsula. The site consists of two active PAs and one inactive PA that is now mainly a shrub/brush rangeland. Six beneficial use PAs are proposed for construction at Shoal Point (Shoal Point Placement Areas or SPPA) To the west of Shoal Point is a large area of industrial land use, primarily occupied by chemical refineries and storage facilities, and transportation land use, primarily rail and port facilities. Texas City Terminal Railway (TCT) lines and electrical transmission lines traverse the industrial area. Shoal Point is separated from the industrial area and transportation facilities by TCC and Turning Basin. To the north of the site lies the Dike, a 5-mile-long jetty used for fishing, boating, and swimming. Beyond the industrial areas to the west and northwest of the project area lie older residential and commercial areas of Texas City, as well as city parks, churches and schools. Many of the commercial establishments appear to be abandoned.

Pelican Island PA. Pelican Island lies within the corporate limits of Galveston to the north of Galveston Island and is accessed via Pelican Island Causeway from Galveston Island and Seawolf Parkway across the island. The Gulf Intracoastal Waterway separates Pelican Island from a small island (Pelican Spit) to the northwest. One of the proposed beneficial use sites for the Federal Project will be constructed on the western shore of Pelican Island approximately one-half mile south of Pelican Spit, which is undeveloped. The only landside access to the proposed beneficial use site is by a levee road. The TCC parallels the site to the northeast, and is intersected by the Houston Ship Channel (HSC) and the Bolivar Roads Channel in the vicinity of Seawolf Park. A USGS 7.5-minute topographical map of the site shows various towers and lights in the vicinity, and a gas well nearly one mile west of the site. Maritime industries and Texas A&M University-Galveston are found along the southern flank of the island. At the far east end of Pelican Island lies Seawolf Park.

Texas City Dike. Paralleling the north side of the TCC is the Dike, from which the Pelican Island site is visible. North of the Dike is the HSC. The Sampson Yarborough boat ramp, a bait shop, and a restaurant lie at the end of the dike. Boat ramps are also located on the dike. Two areas on the north side of the dike are used for placement of sandy material dredged from the TCC. Periodic replenishment of the beach protects the integrity of the dike from strong currents, and secondarily, provides recreation areas. Two groins are proposed to be constructed on the north side of the Dike to reduce currents and trap sediment. The area between the groins will also be used beneficially for placement of beach quality sand from TCC.

2.f. After-action (i.e. post-project construction) changes to the project area. Dredging activities required to deepen the TCC and Turning Basin will permanently alter bay bottom bathymetry. The current channel would be deepened by five feet to 45 feet from Shoal Point to the intersection with the HSC while maintaining the current 400-foot width. Surface topography changes would primarily be associated with construction of the beneficial use PAs and the dike groins. The groins are designed to entrap and retain beach material. Approximately 256,000 cubic yards (CY) of new work material and 94,000 CY of material dredged from TCC Station 28+000 to Station 31+000 to ease a bend in the channel will be used to construct the two groins at the Dike and fill the proposed PAs. Construction of the groins and filling PA 2C will result in approximately 76 acres of bay bottom impacts.

Approximately 4.8 million CY of material dredged from the channel and Turning Basin will be utilized for construction of containment levees for Shoal Point Placement Areas (SPPA) 1, 2, 3, 4, and 5. These PAs will be used beneficially to create marsh. Approximately 1,162 acres of bay bottom will be impacted by construction of these PAs; however, these impacts will eventually result in the creation of 999 acres of new intertidal marsh. The bathymetric and topographic changes resulting from the Federal Project are expected to have negligible impacts on Galveston Bay.

Table 2: Placement Area Impacts and Marsh Creation.

Placement Area Impacts and Marsh Creation		
Placement Areas	Bay Bottom Impacted (acres)	Emergent Marsh Created (acres)
SPPA 1*	357	95
SPPA 1A*		262
SPPA 2	156	124
SPPA 3	469	138
SPPA 4		120
SPPA 5		161
Pelican Island PA	104	99
PA 2C	75	NA
PA 2C groins	0.6	NA
TOTALS	1,161.6	999

*To be constructed by the non-Federal Sponsor

2.g. Biological assessment of the action area before and after the project. Biological conditions before construction of the proposed project are provided in item 1.e., above, and in greater detail in the Draft GRR and EA. Biological conditions after project construction are summarized below.

The Federal Project proposes to place dredged material in the PAs previously coordinated for the Shoal Point Project. These PAs include the proposed Pelican Island PA, the groin beach replenishment PA 2C at the Dike, proposed SPPAs 1, 2, 3, 4, and 5, existing Shoal Point upland PAs 5 and 6, and the existing groin beach replenishment PAs 2A and 2B on the north side of the Dike. New construction and maintenance dredged material from the Federal Project will be used beneficially at SPPAs 1-5, Pelican Island PA, and Dike PAs 2A-C. The beneficial use SPPAs have been located to avoid impacts to oyster reefs that were identified adjacent to Shoal Point during surveys conducted for the Shoal Point EIS. Cells within the beneficial use PAs will be filled to an elevation conducive to the growth of intertidal marsh. Internal circulation and bay exchange will be included in their design. Once established, the marsh creation sites will be planted and monitored. Upland plant communities will not be impacted because no upland habitat will be disturbed by the proposed Federal Project. Beach quality sand will be placed in the Dike PAs 2A-C.

Approximately 1,162 acres of bay bottom will be replaced by 999 acres of intertidal marsh as a result of the construction of the proposed PAs. Given the historic loss of marsh in the Galveston Bay system, creation of marsh is considered beneficial despite the loss of bay bottom habitat. An evaluation of the environmental consequences to the aquatic environment for the Shoal Point EIS determined that the proposed project will result in temporary, elevated turbidities that may affect some aquatic organisms during construction. Turbidities in open-bay habitat would be expected to return to ambient conditions after construction ceases. Construction of PA levees with new work material may result in a fluid mud flow, with fine silt particles settling out over the bottom for up to 2,500 feet from the placement center, possibly impacting infaunal communities. Following levee construction, re-colonization of the sediments by infaunal communities is expected to occur over a 3-12 month time period. Also, areas of hard bottom within the mud flow zone could be buried and become unsuitable for oyster habitat. These impacts have been be minimized by positioning the proposed PAs a sufficient distance away from identified oyster reefs. It is likely that areas with hard substrate experience enough wave energy to resuspend the material and will revert back to original conditions after construction is complete.

The loss of productive EFH during construction of the PAs will have temporary adverse impacts on adult and juvenile brown and white shrimp and red drum. However, the creation of marsh will benefit these species by creating new intertidal habitat. Conservation measures incorporated into the Federal Project to ensure minimal impacts to EFH include designing the marsh creation PAs with internal circulation and tidal exchange.

2.h. All threatened and endangered (T/E) species potentially present in the action area, including sea turtles and smalltooth sawfish. The following table contains the Federally-protected species under the jurisdiction of NMFS and USFWS for the State of Texas as provided in correspondence dated October 13, 2005 and December 5, 2005, respectively that may be present in the Federal Project area or potentially impacted by the project. Of particular concern are several of the listed birds, sea turtles, and fish. All other species listed in Table 2, above, are considered unlikely to be present and include the plants, Attwater's greater prairie-chicken, whales, invertebrates, and many of the fish.

Table 3: Threatened and Endangered Species Potentially Present in the Federal Project Area.

Common Name	Scientific Name	Status	Jurisdiction
BIRDS			
brown pelican	*Pelecanus occidentalis*	E	USWFS
piping plover	*Charadrius melodus*	T; CH	USFWS
reddish egret	*Egretta rufescens*	SOC	USFWS
TURTLES			
Texas diamondback terrapin	*Malaclemys terrapin littoralis*	SOC	USFWS
green sea turtle	*Chelonia mydas*	T	NMFS USFWS
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	NMFS USFWS
loggerhead sea turtle	*Caretta caretta*	T	NMFS USFWS
FISH			
largetooth sawfish	*Pristis pristis*	SOC	NMFS
saltmarsh topminnow	*Fundulus jenkinsi*	SOC	NMFS

2.i. Potential impacts to T/E species and their habitat resulting from project activities.

Brown pelican. The brown pelican nesting site on Pelican Spit will not be impacted by construction of the Pelican Island PA. Brown pelicans use the general project area for loafing, and may be temporarily displaced by construction. The groins and beach nourishment proposed for PA 2C will increase loafing habitat for this bird.

Piping plover. Although piping plovers may occur in the project area, it a transitory location for them and lacks their preferred habitat. No impacts to piping plovers or their designated critical habitat are expected to occur as a result of this project.

Reddish egret. Like the plovers, this bird may pass through the project area but is not expected to be present in areas of project construction. Creation of intertidal marsh will benefit this species.

Texas diamondback terrapin. While this species may be present in the general project vicinity, the marsh habitat it depends on will not be impacted by the proposed project, and it is highly unlikely that terrapins will be affected by construction. The project will create habitat for this species.

Sea turtles. All five sea turtle species have been reported along the Texas Coast, but the leatherback and hawksbill sea turtles are the least common in the northwestern Gulf of Mexico, and are not expected to be present in the project area. Impacts to the remaining three species: the green, Kemp's ridley, and loggerhead sea turtles could occur as a result of dredging. In order to avoid impacts to these turtles, cutterhead pipeline dredges will be used for construction and maintenance of the project as a conservation measure. The project will not impact sea turtle feeding or nesting habitat.

Fish. The largetooth sawfish and saltmarsh topminnow may occur in the general project vicinity, but it is unlikely that the project will impact either species. Construction will largely be performed by cutterhead pipeline dredge. These dredges are relatively slow moving and noisy, and easily avoided by fish. If present, displacement by construction will be minimal and transitory to these species. The project will result in the creation of marsh habitat for the saltmarsh topminnow

2.j. Alternatives to the proposed action. There are two alternatives for the proposed project; a No-Action Alternative and the 45-foot Channel Deepening Alternative that has been selected by the sponsor. With the No-Action Alternative, the channel and Turning Basin would remain at a depth of 40 feet and most of the proposed beneficial use PAs would not be constructed. The selected 45-foot Channel Deepening Alternative or proposed Federal Project would deepen the existing 40-foot TCC and Turning Basin to a depth of 45 feet by hydraulic pipeline dredge. Dredged material would be beneficially used to construct confined areas for dredged maintenance material adjacent to Shoal Point and Pelican Island, resulting in approximately 999 acres of intertidal marsh that is expected to benefit the production of fish and wildlife. Beach quality sand dredged from the existing TCC is proposed for placement on the north side of the Dike in PA 2C. Two armored groins will be constructed from new work material from a channel bend easing area to aid in reduction of long shore transport of sand material back into the TCC and enhance the existing beach.

2.k. Any conservation measures to be implemented to prevent or minimize potential adverse effects to T/E species.

A cutterhead pipeline dredge will be used for most channel construction. This dredge will avoid impacts to sea turtles and will cause only temporary displacement of fish and other aquatic life.

Conclusion. The overall conclusion of this assessment is that the proposed Federal Project will have no adverse effect on any federally-listed threatened or endangered species or critical habitat. Although several threatened or endangered species may occur in the project vicinity, the size and mobility of these animals would allow them to avoid the immediate project site during construction.

Attachments:

A –USFWS correspondence dated May 4, 2001.
B – NMFS correspondence dated October 13, 2005
C – USFWS correspondence dated December 2, 2005
D – NMFS correspondence dated March 16, 2006.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051
281/286-8282 / (FAX) 281/488-5882

May 4, 2001

Kathy Calnan
PBS&J
206 Wild Basin Road, Suite 300
Austin, Texas 78746

Dear Ms. Calnan:

This responds to your March 22, 2001 letter requesting threatened and endangered species information for your project area. You are preparing an Environmental Impact Statement for the U.S. Army Corps of Engineers for the proposed Shoal Point Container Terminal. The alternative analysis has identified Cedar Point, Spilmans Island, Alexander Island, Bayport, Shoal Point and Pelican Island as sites needing more rigorous study. These sites are in either Harris, Galveston or Chambers counties, Texas.

At this time, we are providing comments only on federally listed threatened and endangered species issues associated with the proposed project. The Service will provide any other comments and concerns we may have with the proposed project during the agencies review period of the proposed EIS and any associated permits.

Enclosed is an inventory of species of concern for Harris, Galveston and Chambers counties. The inventory includes species that are officially listed as threatened or endangered under the Endangered Species Act as well as candidate species, which are currently under consideration by the U.S. Fish and Wildlife Service for listing as threatened or endangered, but which are not yet the subject of a proposed rule. Candidate species have no legal status and receive no protection under the Act. They are identified for project planning purposes only and to alert you to the possibility that they may be proposed for listing at some future time.

A review of Service files indicates that the endangered brown pelican *Pelecanus occidentalis* nests on Little Pelican Island, a spoil disposal island located to the northwest of Pelican Island. This island has been used by brown pelicans since 1992, with approximately 100 pairs of brown pelicans nesting on the island during the spring of 2000. This site is also used by other colonial nesting waterbirds. To avoid disturbing the brown pelicans and other birds, all activity should remain a minimum of 1000 feet away from the nesting areas during the peak nesting season from February 15 to September 1.

If you have any questions or if we can be of further assistance, please contact Edith Erfling at 281/286-8282.

No attachments came with letter, S. Erfling emailed later.
5/ /01 - K. Calnan

Sincerely,

Carlos H. Mendoza
Act Project Leader, Clear Lake ES Field Office

Attachment A

COUNTY-BY-COUNTY LISTING
LISTED/CANDIDATE SPECIES AND SPECIES OF CONCERN WITHIN CLEAR LAKE OFFICE AREA OF RESPONSIBILITY
(MARCH 2001)

E = Federally listed as endangered
T = Federally listed as threatened
H = historical occurrence only
M = migrant only N = nesting activity W = winter concentration
*C = candidate species: sufficient information exists to support listing
*SOC = species of concern: further biological information is needed to resolve their conservation status

*Species which have no legal status and receive no protection under the Endangered Species Act. They are identified for project planning purposes only and to alert you to the possibility that they may be proposed for listing at some future time.

ANGELINA COUNTY

T	BALD EAGLE (N) + (W)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*
SOC	bog coneflower	*Rudbeckia scabrifolia*
SOC	Drummond's yellow-eyed grass	*Xyris drummondii*
SOC	rough-leaf yellow-eyed grass	*Xyris scabrifolia*
SOC	slender gay-feather	*Liatris tenuis*
SOC	Texas heelsplitter	*Potamilus amphichaenus*
C	LOUISIANA PINE SNAKE	*Pituophis melanoleucus ruthveni*

AUSTIN COUNTY

E	HOUSTON TOAD	*Bufo houstonensis*
	ATTWATER'S GREATER PRAIRIE-CHICKEN	*Tympanuchus cupido attwateri*
	BALD EAGLE (M)	*Haliaeetus leucocephalus*

BRAZORIA COUNTY

T	BALD EAGLE (N)	*Haliaeetus leucocephalus*
E	BROWN PELICAN (N)	*Pelecanus occidentalis*
T	PIPING PLOVER (W)	*Charadrius melodus*
T	GREEN SEA TURTLE	*Chelonia mydas*
E	KEMP'S RIDLEY SEA TURTLE	*Lepidochelys kempii*
T	LOGGERHEAD SEA TURTLE	*Caretta caretta*
SOC	Texas windmill-grass	*Chloris texensis*
SOC	Texas diamondback terrapin	*Malaclemys terrapin littoralis*
SOC	southeastern snowy plover	*Charadrius alexandrinus tenuirostris*
SOC	reddish egret	*Egretta rufescens*

CHAMBERS COUNTY

T	BALD EAGLE (N)	*Haliaeetus leucocephalus*
E	BROWN PELICAN	*Pelecanus occidentalis*
T	PIPING PLOVER (W)	~~*Charadrius melodus*~~
T	GREEN SEA TURTLE	*Chelonia mydas*
E	KEMP'S RIDLEY SEA TURTLE	*Lepidochelys kempii*
T	~~LOGGERHEAD SEA TURTLE~~	*Caretta caretta*
SOC	Texas windmill-grass	*Chloris texensis*
SOC	Texas diamondback terrapin	*Malaclemys terrapin littoralis*
SOC	southeastern snowy plover	*Charadrius alexandrinus tenuirostris*

COLORADO COUNTY

E	HOUSTON TOAD	*Bufo houstonensis*
E	ATTWATER'S GREATER PRAIRIE-CHICKEN	*Tympanuchus cupido attwateri*
T	BALD EAGLE (N) + (W)	*Haliaeetus leucocephalus*

FAYETTE COUNTY

T	BALD EAGLE (N)	*Haliaeetus leucocephalus*

FORT BEND COUNTY

E	PRAIRIE DAWN	*Hymenoxys texana*
T	BALD EAGLE (N)	*Haliaeetus leucocephalus*

GALVESTON COUNTY

E	ATTWATER'S GREATER PRAIRIE-CHICKEN	*Tympanuchus cupido attwateri*
E	BROWN PELICAN	*Pelecanus occidentalis*
T	PIPING PLOVER (W)	*Charadrius melodus*
T	GREEN SEA TURTLE	*Chelonia mydas*
E	KEMP'S RIDLEY SEA TURTLE	*Lepidochelys kempii*
T	LOGGERHEAD SEA TURTLE	*Caretta caretta*
SOC	Texas windmill-grass	*Chloris texensis*
SOC	Houston machaeranthera	*Machaeranthera aurea*
SOC	Texas diamondback terrapin	*Malaclemys terrapin littoralis*
SOC	southeastern snowy plover	*Charadrius alexandrinus tenuirostris*
SOC	reddish egret	*Egretta rufescens*

HARDIN COUNTY

E	TEXAS TRAILING PHLOX	*Phlox nivalis* var. *texensis*
T	BALD EAGLE (M)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*
SOC	white firewheel (=white blanket-flower)	*Gaillardia aestivalis* var. *winkleri*
SOC	paddlefish	*Polyodon spathula*

HARRIS COUNTY

E	PRAIRIE DAWN	*Hymenoxys texana*
T	BALD EAGLE (N) + (W)	*Haliaeetus leucocephalus*
SOC	Texas windmill-grass	*Chloris texensis*
SOC	Houston machaeranthera	*Machaeranthera aurea*

HOUSTON COUNTY

T	BALD EAGLE (W)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*
C	NECHES RIVER ROSE-MALLOW	*Hibiscus dasycalyx*
SOC	Texas heelsplitter	*Potamilus amphichaenus*

JASPER COUNTY

E	NAVASOTA LADIES'-TRESSES	*Spiranthes parksii*
T	BALD EAGLE (N)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*
SOC	bog coneflower	*Rudbeckia scabrifolia*
SOC	Drummond's yellow-eyed grass	*Xyris drummondii*
SOC	rough-leaf yellow-eyed grass	*Xyris scabrifolia*
SOC	slender gay-feather	*Liatris tenuis*
SOC	tiny bog-buttons	*Lachnocaulon digynum*
SOC	Texas heelsplitter	*Potamilus amphichaenus*
SOC	paddlefish	*Polyodon spathula*
[illegible]	LOUISIANA PINE SNAKE	*Pituophis melanoleucus ruthveni*

JEFFERSON COUNTY

E	BROWN PELICAN	*Pelecanus occidentalis*
T	GREEN SEA TURTLE	*Chelonia mydas*
	KEMP'S RIDLEY SEA TURTLE	*Lepidochelys kempii*
	LOGGERHEAD SEA TURTLE	*Caretta caretta*
SOC	paddlefish	*Polyodon spathula*

LIBERTY COUNTY

T	BALD EAGLE (N)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*
SOC	paddlefish	*Polyodon spathula*

MATAGORDA COUNTY

T	BALD EAGLE (N)	*Haliaeetus leucocephalus*
E	BROWN PELICAN (N)	*Pelecanus occidentalis*
T	PIPING PLOVER (W)	*Charadrius melodus*
T	GREEN SEA TURTLE	*Chelonia mydas*
E	KEMP'S RIDLEY SEA TURTLE	*Lepidochelys kempii*
T	LOGGERHEAD SEA TURTLE	*Caretta caretta*
SOC	Texas diamondback terrapin	*Malaclemys terrapin littoralis*
SOC	Texas horned lizard	*Phrynosoma cornutum*
SOC	southeastern snowy plover	*Charadrius alexandrinus tenuirostris*
SOC	reddish egret	*Egretta rufescens*

MONTGOMERY COUNTY

T	BALD EAGLE (N) + (W)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*

NACOGDOCHES COUNTY (Angelina National Forest only)

	BALD EAGLE (W) (N outside ANF)	*Haliaeetus leucocephalus*
	RED-COCKADED WOODPECKER	*Picoides borealis*
	TEXAS GOLDEN GLADECRESS (introduced)	*Leavenworthia texana*

NEWTON COUNTY

T	BALD EAGLE (N) + (W)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*
T	LOUISIANA BLACK BEAR (H)	*Ursus americanus luteolus*
SOC	bog coneflower	*Rudbeckia scabrifolia*
SOC	Drummond's yellow-eyed grass	*Xyris drummondii*
SOC	rough-leaf yellow-eyed grass	*Xyris scabrifolia*
SOC	slender gay-feather	*Liatris tenuis*
SOC	tiny bog-buttons	*Lachnocaulon digynum*
SOC	paddlefish	*Polyodon spathula*
C	LOUISIANA PINE SNAKE	*Pituophis melanoleucus ruthveni*

ORANGE COUNTY

T	BALD EAGLE (M)	*Haliaeetus leucocephalus*
SOC	paddlefish	*Polyodon spathula*

POLK COUNTY

E	TEXAS TRAILING PHLOX	*Phlox nivalis* var. *texensis*
~~T~~	~~BALD EAGLE (N) + (W)~~	~~*Haliaeetus leucocephalus*~~
E	RED-COCKADED WOODPECKER	*Picoides borealis*
SOC	paddlefish	*Polyodon spathula*

SABINE COUNTY

T	BALD EAGLE (N) + (W)	*Haliaeetus leucocephalus*

E	RED-COCKADED WOODPECKER	*Picoides borealis*
T	LOUISIANA BLACK BEAR (H)	*Ursus americanus luteolus*
SOC	bog coneflower	*Rudbeckia scabrifolia*
[illegible]	rough-leaf yellow-eyed grass	*Xyris scabrifolia*
SOC	slender gay-feather	*Liatris tenuis*
SOC	southern lady's-slipper	*Cypripedium kentuckiense*
C	TEXAS GOLDEN GLADECRESS (H)	*Leavenworthia texana*
C	LOUISIANA PINE SNAKE	*Pituophis melanoleucus ruthveni*

SAN AUGUSTINE COUNTY

E	WHITE BLADDERPOD	*Lesquerella pallida*
T	BALD EAGLE (N) + (W)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*
SOC	southern lady's-slipper	*Cypripedium kentuckiense*
C	TEXAS GOLDEN GLADECRESS	*Leavenworthia texana*

SAN JACINTO COUNTY

T	BALD EAGLE (N) + (W)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*

SHELBY COUNTY (Sabine National Forest only)

T	BALD EAGLE (N) + (W)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*
T	LOUISIANA BLACK BEAR (H)	*Ursus americanus luteolus*

TRINITY COUNTY

T	BALD EAGLE (N) + (W)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*
C	NECHES RIVER ROSE-MALLOW	*Hibiscus dasycalyx*
[illegible]	Texas heelsplitter	*Potamilus amphichaenus*

TYLER COUNTY

E	TEXAS TRAILING PHLOX	*Phlox nivalis* var. *texensis*
T	BALD EAGLE (N)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*
SOC	slender gay-feather	*Liatris tenuis*
SOC	Texas heelsplitter	*Potamilus amphichaenus*
SOC	paddlefish	*Polyodon spathula*
C	LOUISIANA PINE SNAKE	*Pituophis melanoleucus ruthveni*

WALKER COUNTY

T	BALD EAGLE (N) + (W)	*Haliaeetus leucocephalus*
E	RED-COCKADED WOODPECKER	*Picoides borealis*

WALLER COUNTY

T	BALD EAGLE (M)	*Haliaeetus leucocephalus*
SOC	Texas (Houston) meadow-rue	*Thalictrum texanum*

WHARTON COUNTY

T	BALD EAGLE (N)	*Haliaeetus leucocephalus*

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
(727) 824-5312, Fax 824-5309
http://sero.nmfs.noaa.gov

OCT 13 2005

Dear Colleague:

The National Marine Fisheries Service (NOAA Fisheries) Protected Resources Division has reviewed your letter pursuant to section 7(a)(2) of the Endangered Species Act (ESA) concerning the Texas City Channel Deepening Project, Texas City, Galveston County, Texas.

__**There are no ESA-listed species** or designated critical habitat under our purview in the action area.

___**We cannot determine** impacts to threatened or endangered species, or designated critical habitat, under NOAA Fisheries purview because the letter lacks sufficient information to evaluate the project. **Enclosed are guidelines** to conduct a proper biological evaluation.

___**Please provide a letter** from the lead federal action agency designating you to conduct ESA section 7 consultation with this office.

_X__**Enclosed is a list** of federally-protected species under the jurisdiction of NOAA Fisheries for the state of **Texas.** Biological information on federally-protected species and candidate species can be found at the following website addresses: http://www.nmfs.noaa.gov/prot_res/prot_res.html; http://noflorida.fws.gov/SeaTurtles/seaturtle-info.htm); http://endangered.fws.gov/wildlife.html#Species; http://www.cmc-ocean.org/main.php3; http://floridaconservation.org/psm/turtles/turtle.htm; http://obis.env.duke.edu/data/sp_profiles.php; www.mote.org/~colins/Sawfish/SawfishHomePage.html; www.floridasawfish.com; www.flmnh.ufl.edu/fish/sharks/InNews/sawprop.htm;.Gulf sturgeon critical habitat rule and maps (http://alabama.fws.gov/gs/); http://www.cccturtle.org;.

__ **It is NOAA Fisheries opinion that the project will have no effect** on listed species or critical habitat protected by the ESA under NOAA Fisheries purview. No further consultation with NOAA Fisheries pursuant to section 7(a)(2) of the ESA is required unless the project description changes.

Consultation with NOAA Fisheries, Habitat Conservation Division (HCD), pursuant to the Magnuson-Stevens Fishery Conservation and Management Acts requirements for essential fish habitat consultation may be required. Please contact HCD at (727) 570-5317. **If you have any ESA questions, please contact the consulting biologist, ________________ at (727) 824-5312, or by e-mail at** ________________, or our ESA section 7 coordinator, Eric Hawk, at the same number or by e-mail at eric.hawk@noaa.gov.

____**Other:**____.

Sincerely,

Teletha Mincey

Teletha Mincey
Administrative Support Assistant
Protected Resources Division

Enclosure
File: 1514-22.b
O:\FORMS\Form letters\specieslistltr51wpd.wpd

Endangered and Threatened Species and Critical Habitats
under the Jurisdiction of the NOAA Fisheries

Texas

Listed Species	Scientific Name	Status	Date Listed
Marine Mammals			
blue whale	*Balaenoptera musculus*	Endangered	12/02/70
finback whale	*Balaenoptera physalus*	Endangered	12/02/70
humpback whale	*Megaptera novaengliae*	Endangered	12/02/70
sei whale	*Balaenoptera borealis*	Endangered	12/02/70
sperm whale	*Physeter macrocephalus*	Endangered	12/02/70
Turtles			
green sea turtle	*Chelonia mydas*	Threatened[1]	07/28/78
hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	06/02/70
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered	12/02/70
leatherback sea turtle	*Dermochelys coriacea*	Endangered	06/02/70
loggerhead sea turtle	*Caretta caretta*	Threatened	07/28/78
Fish			
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Threatened	09/30/91

Designated Critical Habitat
None

Species Proposed for Listing
Acropora palmata (elkhorn coral)
Acropora cervicornis (staghorn coral)

Proposed Critical Habitat
None

[1] Green turtles are listed as threatened, except for breeding populations of green turtles in Florida and on the Pacific Coast of Mexico, which are listed as endangered

Texas

Candidate Species[2]	Scientific Name
none	

Species of Concern[3]	Scientific Name
Fish	
dusky shark	*Carcharhinus obscurus*
goliath grouper	*Epinephelus itajara*
largetooth sawfish	*Pristis pristis*
night shark	*Carcharhinus signatus*
saltmarsh topminnow	*Fundulus jenkinsi*
sand tiger shark	*Odontaspis taurus*
speckled hind	*Epinephelus drummondhayi*
Warsaw grouper	*Epinephelus nigritus*
white marlin	*Tetrapturus albidus*
Invertebrates	
ivory bush coral	*Oculina varicosa*

[2] The Candidate Species List has been renamed the Species of Concern List. The term "candidate species" is limited to species that are the subject of a petition to list and for which NOAA Fisheries has determined that listing may be warranted (69 FR 19975).

[3] Species of Concern are not protected under the Endangered Species Act, but concerns about their status indicate that they may warrant listing in the future. Federal agencies and the public are encouraged to consider these species during project planning so that future listings may be avoided.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051
281/286-8282 / (FAX) 281/488-5882

December 2, 2005

Carolyn Murphy
Chief, Environmental Section
Department of the Army
Galveston District, Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Dear Ms. Murphy:

This responds to your letter dated October 7, 2005, requesting information on federally listed species that may occur in the Corps of Engineers' Texas City Channel Deepening Project area, located in Galveston County, Texas. The project proposes to deepen the existing 40-foot channel and turning basin to a depth of 45 feet.

A review of Service files indicates that the following species and critical habitat may occur in your project area:

Attwater's greater prairie-chicken (*Tympanuchus cupido attwateri*) - Endangered

Brown pelican (*Pelecanus occidentalis*) - Endangered

Piping plover (*Charadrius melodus*) - Threatened, with critical habitat

Kemp's ridley sea turtle (*Lepidochelys kempii*) - Endangered

Loggerhead sea turtle (*Caretta caretta*) - Threatened

Green sea turtle (*Chelonia mydas*) - Threatened

You should evaluate your project for potential effects to these species. The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling Endangered Species Act requirements at http://endangered.fws.gov/consultations/s7hndbk/s7hndbk.htm. In addition, the NOAA Fisheries Protected Resource Branch (David Bernhart, 727/551-5767) should be contacted for additional information on listed species under their jurisdiction.

If you have any questions, please contact Catherine Yeargan or Moni Belton at 281/286-8282.

Sincerely,

Carlos H. Mendoza
Field Supervisor, Clear Lake ES Field Office

cc
David Bernhart, NOAA Fisheries Protected Resources Division, St. Petersburg, Florida

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO
ATTENTION OF

February 7, 2006

Environmental Section

David M. Bernhart
Assistant RA for Protected Resources
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, FL 33701

Dear Mr. Bernhart:

This is in response to your October 13, 2005 letter expressing concerns that the proposed Federal Texas City Channel deepening project will impact Federally listed species that may occur in the project area. Areas designated as critical habitat are essential to the conservation of a listed species and may require special management considerations or protection. Federal agencies may not fund, authorize, license, permit, or carry out an action that would destroy or adversely modify critical habitat.

The project proposes to deepen the existing 40-foot Texas City Channel and turning basin to a depth of 45 feet. This project is expected to be completed using a hydraulic pipeline dredge. Dredged material would be beneficially used to construct confined areas for dredged maintenance material adjacent to Shoal Point and Pelican Island. After the areas have reached a predetermined target elevation, the areas will be contoured, planted and shaped to form approximately 664 acres of intertidal marsh which is expected to benefit the production of fish and wildlife habitat. Sand dredged from the existing Texas City Channel is proposed to be placed on the north side of the Texas City Dike. Two armored groins will be constructed from new work material from the channel bend easing area to aid in reduction of long shore transport of sand material back into the Texas City Channel. This is essentially the same project that was addressed in the Shoal Point Container Terminal Project (Permit No. 21979).

The National Marine Fisheries Service (NMFS) has listed eight endangered and three threatened species that are under the jurisdiction of the NMFS for the state of Texas. The blue whale, finback whale, humpback whale, sei whale, sperm whale, hawksbill sea turtle, Kemps ridley sea turtle, and the leatherback sea turtle are listed as endangered. The NMFS has listed the loggerhead sea turtle, the green sea turtle, and the gulf Sturgeon as threatened for the state of Texas.

The distribution of the blue whale in the western North Atlantic generally extends from the Arctic to at least mid-latitude waters, where it migrates to feeding grounds in the spring and summer after wintering in subtropical and tropical waters. The blue whale is best considered as an occasional visitor in US Atlantic Exclusive Economic Zone (EEZ) waters, which may represent the current southern limit of its feeding. Records suggested an occurrence of this species south to Florida and the Gulf of Mexico, although the actual southern limit of the species' range is unknown.

Finback whales are common in waters of the US Atlantic Exclusive Economic Zone (EEZ), principally from Cape Hatteras northward. At-sea sightings in the north-central Gulf of Mexico confirm their presence throughout the year. Finback whales feed mainly on pelagic crustaceans and fish and are known to come close to shore in pursuit of fish along the New England coast. No sightings or records of finback whales are known to occur in the nearshore waters adjacent to the study area in the northwestern Gulf of Mexico.

Humpback whales occur in all oceans. In the western North Atlantic they migrate between their summer feeding grounds off Cape Cod to their winter calving and breeding grounds in the Caribbean. A total of four sightings and five captures in the Gulf of Mexico were reported, with the only recorded humpback whale sighting in Texas occurring off of Galveston.

Often found in deeper waters, Sei whales occur in all oceans, but are rare in tropical or polar seas. They are widely distributed in nearshore waters of the North Atlantic from the Gulf of Mexico and the Caribbean to Nova Scotia and Newfoundland. Their occurrence in the Gulf of Mexico is limited to strandings from Campeche, Mexico, Mississippi and Louisiana and to one probable at-sea sighting. No record of their occurrence in the nearshore waters of the study area exists. Although known to take fish prey, sei whales (like right whales) are largely planktivorous, feeding primarily on euphausiids and copepods.

Sperm whales are found throughout the world's oceans in deep waters to the edge of the ice at both poles. Although at least four sperm whale strandings have been recorded along the beaches of South Padre Island, its normal range is limited to the deeper waters beyond the continental shelf where it forages for squid and other deepwater species. Sperm whales appear to be the most abundant large cetacean in the Gulf of Mexico.

The relatively shallow Galveston Bay system is not suitable habitat for whales. The likelihood of encountering a whale in the project area is considered remote.

The Gulf sturgeon, also known as the Gulf of Mexico sturgeon, is a subspecies of the Atlantic sturgeon. Adult fish are bottom feeders, eating primarily invertebrates, including brachiopods, insect larvae, mollusks, worms and crustaceans. Gulf sturgeon are anadromous, with reproduction occurring in fresh water. Most adult feeding takes place in the Gulf of Mexico and its estuaries. The fish return to breed in the river system in which they hatched. Spawning occurs in areas of deeper water with clean (rock and rubble) bottoms. The eggs are sticky and adhere in clumps to snags, outcroppings, or other clean surfaces. Historically, the Gulf sturgeon occurred from the Mississippi River to Charlotte Harbor, Florida. It still occurs, at least occasionally, throughout this range, but in greatly reduced numbers. The fish is essentially confined to the Gulf of Mexico. River systems where the Gulf sturgeon are known to be viable today include the Mississippi, Pearl, Escambia, Yellow, Choctawhatchee, Appachicola, and Swannee Rivers, and possibly others. The likelihood of encountering the Gulf sturgeon in the project area is possible, but only remotely probable.

All five sea turtle species have been reported along the Texas Coast, but the leatherback and hawksbill are the least common in the northwestern Gulf of Mexico and least likely to enter Texas bays. The leatherback is an oceanic species which does not normally enter estuaries. The hawksbill prefers rock or coral reefs in more tropical waters. The other three species of sea turtles, when sighted, are frequently found in coastal waters and bays. The green sea turtle is herbivorous and is most likely to occur in the southern bays of Texas where clear water and seagrass and algal beds are more abundant than in the study area of the upper Texas coast. Adult loggerheads are more commonly found offshore around oil platforms and rock reefs, but the juveniles are more likely to enter the bays to feed. The Kemp's ridley sea turtle migrates along the coast of Texas and is probably the most common sea turtle in Texas. It frequently enters bays to feed on shrimp, crab, and other invertebrates. Of all the sea turtles, only the Kemp's ridley and the loggerhead, have been recorded from Galveston Bay, with a loggerhead having been sighted in the Bolivar Roads area.

If present in the area, dredging activities may affect these sea turtle species through an increase in sedimentation and turbidity. The sedimentation may impact food sources for the turtles, and the turbidity could affect primary productivity. This would be short-term, however. There should be no physical impacts to sea turtles, as they are highly mobile and can avoid the cutterhead dredge expected to be used for this project. Pipeline dredges are relatively stationary and, therefore, act on small areas at any given time. An increase in marine traffic could result in a higher incidence of collision with sea turtles. There is no designated critical habitat identified for sea turtles in the project area and sea turtles are not expected to nest in the project area due to the lack of suitable habitat.

Nine fish species and one invertebrate are listed as Species of Concern (SOC) for the state of Texas: dusky shark, goliath grouper, largetooth sawfish, night shark, saltmarsh topminnow, sand tiger shark, speckled hind, Warsaw grouper, white marlin and the ivory bush coral. SOC are not protected under the Endangered Species Act, but are listed because of concerns about their status and should be considered during project planning. These species are listed due to their declining numbers, or in some cases, their slow recovery, and loss of habitat. Although remote, these fish could occur in the Texas City Channel project area, with the exception of the largetooth sawfish, saltmarsh topminnow, and the sand tiger shark that prefer shallow water depths. The Texas City Channel project area is not suitable habitat for the ivory bush coral. No Designated Critical Habitat under the jurisdiction of NMFS was identified in the project area.

This review of the Texas City Channel deepening project activities relative to compliance with requirements of Section 7, subsection (a)(2) of the Endangered Species Act Amendments of 1978, indicates the project may affect, but is not likely to have a significant adverse affect on the listed species or critical habitat.

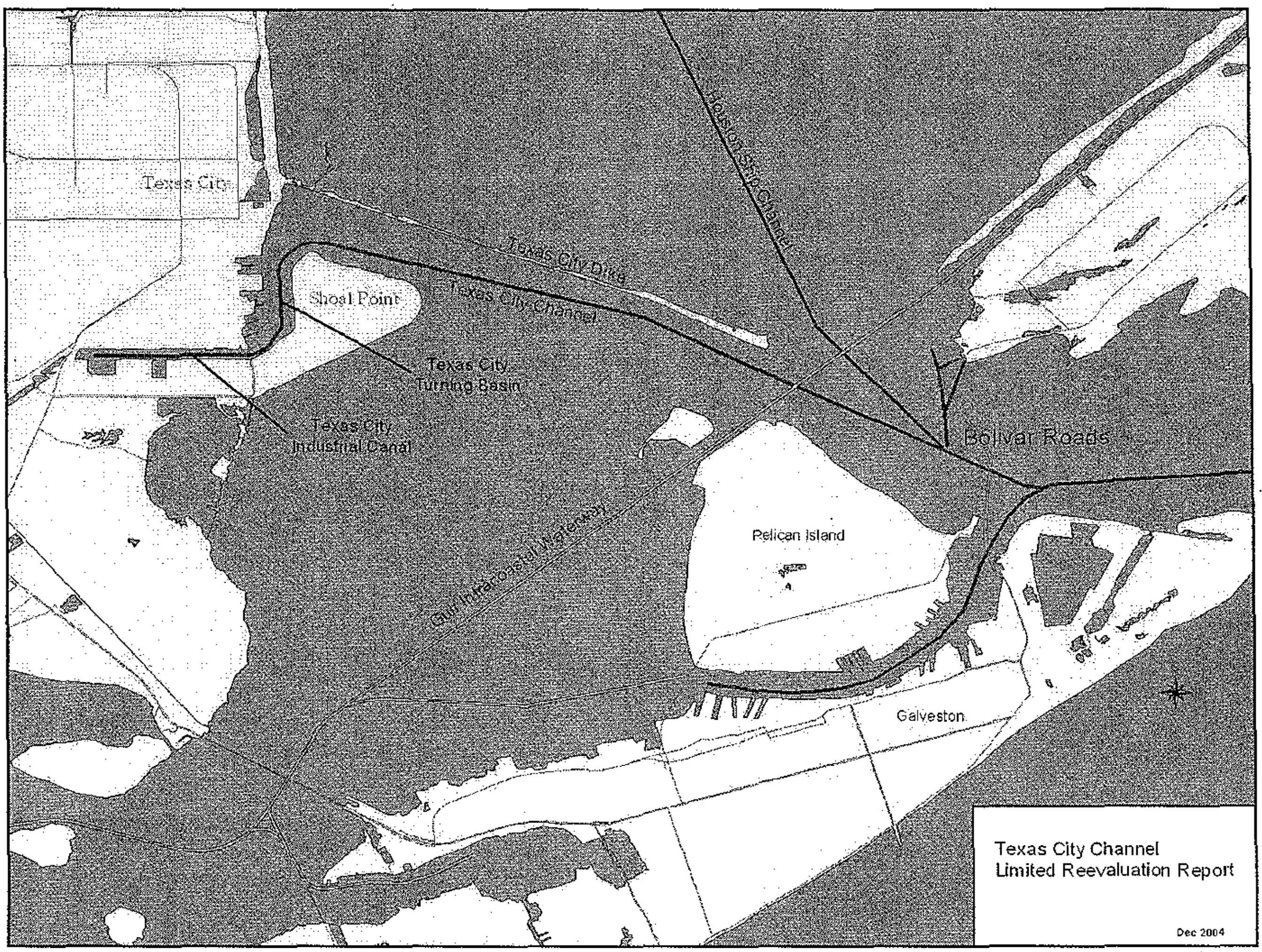
If you or your staff have any questions regarding this activity, please contact Kristy Morten at (409) 766-3195.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Enclosure

CF:
Mr. Rusty Swafford
National Marine Fisheries Service
Habitat Conservation Division
4700 Avenue U
Galveston, Texas 77551


Texas City
Houston Ship Channel
Texas City Dike
Shoal Point
Texas City Channel
Texas City Turning Basin
Texas City Industrial Canal
Bolivar Roads
Pelican Island
Gulf Intracoastal Waterway
Galveston
Texas City Channel
Limited Reevaluation Report
Dec 2004

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701
(727) 824-5312, FAX (727) 824-5309
http://sero.nmfs.noaa.gov

F/SER31:KS

MAR 16 2006

Ms. Carolyn Murphy
Galveston District Corps of Engineers
P.O. Box 1229
Galveston, TX 77553

Dear Ms. Murphy:

This responds to your February 7, 2006, letter regarding the Army Corps of Engineers' (COE) proposed project to dredge the Texas City Channel to a depth of 45 feet and beneficially use a portion of the dredged material to create approximately 664 acres of intertidal marsh adjacent to Shoal Point and Pelican Island. Sand dredged from the channel would be placed on the north side of the Texas City Dike. The project is located in Galveston Bay, Galveston County, Texas.

Your letter evaluated possible effects to species protected by the Endangered Species Act (ESA) under the purview of the National Marine Fisheries Service (NMFS). You requested NMFS' concurrence with your determination that the proposed project may affect, but is not likely to have a significant adverse effect on, listed species or critical habitat present. With your request you submitted a map of the proposed project. The materials submitted detailing the scope of the project and evaluating the possible effects on listed species under our purview are insufficient for us to make a determination about the effects of the project on these species.

To comply with section 7 regulations (50 CFR 402.14(c)), we specifically request that the following information be provided.

1. Please describe the project completely, including:
   a. Expected start and end dates;
   b. Construction methods to be utilized;
   c. A description of the entire action area;
   d. The boundaries of the action area;
   e. The baseline conditions in the action area;
   f. After-action (i.e., post-project construction) changes to the action area;
   g. A biological assessment of the action area before and after the project;
   h. All threatened and endangered (T/E) species potentially present in the action area, including sea turtles and smalltooth sawfish (we do not expect listed whales to be in the action area);
   i. Potential impacts to T/E species and their habitat resulting from project activities;
   j. Alternatives to the proposed action; and
   k. Any conservation measures to be implemented to prevent or minimize potential adverse effects to T/E species.

Attachment D

Section 7 allows NMFS up to 90 days to conclude formal consultation with your agency, and an additional 45 days to prepare our biological opinion (unless we mutually agree to an extension). Therefore, if formal consultation is necessary, our anticipated biological opinion completion date is 135 days from the date of our receipt of the information requested above. The ESA requires that, after initiation of formal consultation, the federal action agency must make no irreversible or irretrievable commitment of resources that limits future options. This practice ensures agency actions do not preclude the formulation and implementation of reasonable and prudent alternatives that avoid jeopardizing the continued existence of endangered or threatened species, or destroying or modifying their critical habitats. If the information we have requested from the applicant allows us to determine that the section 7 consultation can be accomplished informally, NMFS will respond within 30 calendar days if possible.

If you have any questions, please contact Kelly Shotts, Biologist, at (225) 389-0508 x 209, or by e-mail at kelly.shotts@noaa.gov.

Sincerely,

David M. Bernhart
Assistant Regional Administrator
for Protected Resources

File: 1514-22.f.1.TX
Ref: I/SER/2006/00484

Texas City Channel Deepening Project
General Reevaluation Report and
Environmental Assessment
October 2007

Appendix J
Cultural Resource Coordination

- December 15, 2006 Correspondence to Advisory Council on Historic Preservation
- December 15, 2006 Correspondence to the City of Texas City
- December 15, 2006 Correspondence to The Naval Historical Center
- December 15, 2006 Correspondence to Texas Historical Commission
- December 29, 2006 Correspondence from Advisory Council on Historic Preservation
- January 23, 2007 Correspondence from Texas Historical Commission
- February 15, 2007 Correspondence from The Naval Historical Center
- April 2, 2007 Correspondence from the City of Texas City
- May 1, 2007 Correspondence to The Naval Historical Center, Texas Historical Commission and the City of Texas City

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229
DECEMBER 15, 2006

Environmental Section

Mr. Don Klima
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue, NW, Suite 803
Washington, DC 20004

Dear Advisory Council on Historic Preservation (Council):

The US Army Corps of Engineers, Galveston District (CE), proposes to initiate a Programmatic Agreement (PA) pursuant to 36CFR800.6 and 36CFR800.14 (b)(3) to address impacts associated with improving navigation on the existing Texas City Channel, Galveston County, Texas. A Draft Environmental Assessment (EA) of the proposed improvements is planned to be released for public comment in late December, 2006. We find it necessary to negotiate a programmatic agreement because effects on historic properties cannot be fully determined prior to approval of this complex undertaking. With this letter, we invite your participation in the proposed PA pursuant 36 CFR 800.6 (a)(1)(i)(C).

The following improvements are proposed in association with the Texas City Channel 45-Foot Project (TCC): 1) enlarging the existing channel to 45-feet deep and incidental widening in areas; 2) constructing two hydraulic fill groins on the north end of the Texas City Dike and filling the 90-acre area with dredged material to expand water-oriented recreational area; and, 3) a Dredged Material Management Plan (DMMP) for the disposal of new work and maintenance materials. All of these proposed improvements are shown on the maps provided as Enclosure 1. The location of these improvements corresponds to the area of potential effects (APE).

Most, but not all, of the APE has been surveyed for historic properties (Jones et al. 2002; Gearhart et al. 2005; Enright et al. 2005; Gearhart et al 2006). These reports can be provided to you upon request. The reports summarize historical research, nautical remote-sensing surveys and dive assessments which located a shipwreck which has been identified as the remains of the *USS Westfield* (41GV151). The *USS Westfield* is a U.S. Navy flagship that ran aground during the Battle of Galveston and was scuttled to prevent capture on January 1, 1863. We believe that evidence provided in the reports support a determination of eligibility under National Register criteria A, B, and D (36 CFR 60).

The CE proposes negotiation of a PA which outlines procedures to be followed to complete identification, evaluation and assessment investigations of the area of potential effects, and to address adverse effects to the wreck of the *USS Westfield*. This is the only eligible historic property that has been identified to date in the APE. The *USS Westfield* will be adversely affected by channel deepening as the wreck is situated partially within the navigation channel proposed for deepening. Avoidance is not possible because the location of the channel is controlled by existing jetties.

We are proposing a four-party PA (Enclosure 2), to be negotiated among the CE, the City of Texas City (City), the U.S. Naval Historical Center (NHC), and the Texas State Historic Preservation Office (SHPO). The draft PA is being coordinated concurrently with all consulting parties and the Council. The intent of the PA is to avoid or mitigate impacts to historic properties in areas directly affected by new dredging and channel construction, construction staging and access areas, new or extensions of existing placement areas, areas affected by the beneficial uses of dredged material, and ongoing maintenance dredging activities relate to the TCC and to guide the development of a Treatment Plan for the remains of the *USS Westfield* to resolve adverse effects in accordance with 36 CFR 800.6.

We are notifying the Council of our intent to negotiate the PA for the TCC and inviting your participation pursuant 36 CFR 800.6 (a)(1)(i)(C). If you have any questions, please do not hesitate to call Ms. Nicole Minnichbach at 409-766-3878.

Sincerely,

Carolyn Murphy

Carolyn Murphy
Chief, Environmental Section

Enclosures:
1 Maps
2 Draft PA

CC w/o Enclosures

Ms. Janelle Stokes
CESWG-PE-PR

Ms. Nikki Minnichbach
CESWG-PE-PR

<u>References</u>

Enright, J.J. and J.M. Enright and R.L. Gearhart II and D.S. Jones
2005 Diving Assessment of Two Anomalies for Historic Properties Investigations, Texas City Channel Improvements Project, Galveston County, Galveston Bay, Texas. Prepared for USACE, Galveston District

Gearhart, R.L. II and D.S. Jones and J.M. Enright and J. Enright and T. Summerville
2005 Close-Order Remote-Sensing Survey of Five Anomalies and Proposed Channel Modifications for Historic Properties Investigations, Texas City Channel Improvements, Galveston Bay, Texas. Prepared for USACE, Galveston District.

Jones. D.S. and J.M. Enright and J. Watts and R.L Gearhart II.
2002 Side-Scan Sonar, Magnetometer and Bathymetry survey to map oyster Habitat and Submerged Cultural Resources for the Proposed Shoal Point Container Terminal, Galveston Bay, Texas. Prepared for the City of Texas City.

Gearhart, R.L. II and J.J. Enright and A. Borgens and S. Hoskins and D. Jones and J. Enright
2006 Diving Assessment of Two Anomalies for Historic Properties Investigations and National Register Assessment of Site 41GV151 (USS *Westfield*), Texas City Channel Improvements, Galveston Bay, Texas. Prepared for USACE, Galveston District.

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229
DECEMBER 15, 2006

Environmental Section

Mr. Douglas Hoover
The City of Texas City
1801 9th Avenue North
P.O. Drawer 2608
Texas City, TX 77592-2608

Dear Mr. Hoover:

The US Army Corps of Engineers, Galveston District (CE), proposes to initiate a Programmatic Agreement (PA) pursuant to 36CFR800.6 and 36CFR800.14 (b)(3) to address impacts associated with improving navigation on the existing Texas City Channel, Galveston County, Texas. A Draft Environmental Assessment (EA) of the proposed improvements is planned to be released for public comment in late December, 2006. We find it necessary to negotiate a programmatic agreement because effects on historic properties cannot be fully determined prior to approval of this complex undertaking.

The following improvements are proposed in association with the Texas City Channel 45-Foot Project (TCC): 1) enlarging the existing channel to 45-feet deep and incidental widening in areas; 2) constructing two hydraulic fill groins on the north end of the Texas City Dike and filling the 90-acre area with dredged material to expand water-oriented recreational area; and, 3) a Dredged Material Management Plan (DMMP) for the disposal of new work and maintenance materials. All of these proposed improvements are shown on the maps provided as Enclosure 1. The location of these improvements corresponds to the area of potential effects (APE).

Most, but not all, of the APE has been surveyed for historic properties (Jones et al. 2002; Gearhart et al. 2005; Enright et al. 2005; Gearhart et al 2006). These reports can be provided to you upon request. The reports summarize historical research, nautical remote-sensing surveys and dive assessments which located a shipwreck which has been identified as the remains of the *USS Westfield* (41GV151). The *USS Westfield* is a U.S. Navy flagship that ran aground during the Battle of Galveston and was scuttled to prevent capture on January 1, 1863. We believe that evidence provided in the reports support a determination of eligibility under National Register criteria A, B, and D (36 CFR 60).

The CE proposes negotiation of a PA which outlines procedures to be followed to complete identification, evaluation and assessment investigations of the area of potential effects, and to address adverse effects to the wreck of the *USS Westfield*. This is the only eligible historic property that has been identified to date in the APE. The *USS Westfield* will be adversely affected by channel deepening as the wreck is situated partially within the navigation channel proposed for deepening. Avoidance is not possible because the location of the channel is controlled by existing jetties.

We are proposing a four-party PA (Enclosure 2), to be negotiated among the CE, the City of Texas City (City), the U.S. Naval Historical Center (NHC), and the Texas State Historic Preservation Office (SHPO). The draft PA is being coordinated concurrently with all consulting parties and the Advisory Council on Historic Preservation (ACHP). The intent of the PA is to avoid or mitigate impacts to historic properties in areas directly affected by new dredging and channel construction, construction staging and access areas, new or extensions of existing placement areas, areas affected by the beneficial uses of dredged material, and ongoing maintenance dredging activities relate to the TCC and to guide the development of a Treatment Plan for the remains of the *USS Westfield* to resolve adverse effects in accordance with 36 CFR 800.6.

In summary, the CE requests your review of the enclosed PA. Please provide a copy of your comments to all of the consulting parties (addresses provided below). Upon receipt of your comments and finalization of the draft PA in consultation with your office, the NHC and the SHPO, the CE will coordinate a final draft PA with interested Native American Indian tribes in accordance with 36 CFR 800.3 (f)(2). Public coordination required by § 800.3 (a) will be accomplished by inclusion of the final draft PA in the Draft EA, which will be made available for public review and comment. If you have any questions, please don't hesitate to call Ms. Nicole Minnichbach at 409-766-3878.

Sincerely,

Carolyn Murphy

Carolyn Murphy
Chief, Environmental Section

Enclosures:
1 Maps
2 Draft PA

CC w/o Enclosures

James E. Bruseth, Ph.D.
Deputy State Historic
Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

Ms. Barbara Voulgaris
The Naval Historical Center
805 Kidder Breese St., SE
Washington Navy Yard, DC 20374-5060

Mr. Don Klima
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue, NW, Suite 803
Washington, DC 20004

Ms. Janelle Stokes
CESWG-PE-PR

Ms. Nikki Minnichbach
CESWG-PE-PR

References

Enright, J.J. and J.M. Enright and R.L. Gearhart II and D.S. Jones
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DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229
DECEMBER 15, 2006

Environmental Section

Ms. Barbara Voulgaris
The Naval Historical Center
805 Kidder Breese St., SE
Washington Navy Yard, DC 20374-5060

Dear Ms. Voulgaris:

The US Army Corps of Engineers, Galveston District (CE), proposes to initiate a Programmatic Agreement (PA) pursuant to 36CFR800.6 and 36CFR800.14 (b)(3) to address impacts associated with improving navigation on the existing Texas City Channel, Galveston County, Texas. A Draft Environmental Assessment (EA) of the proposed improvements is planned to be released for public comment in late December, 2006. We find it necessary to negotiate a programmatic agreement because effects on historic properties cannot be fully determined prior to approval of this complex undertaking.

The following improvements are proposed in association with the Texas City Channel 45-Foot Project (TCC): 1) enlarging the existing channel to 45-feet deep and incidental widening in areas; 2) constructing two hydraulic fill groins on the north end of the Texas City Dike and filling the 90-acre area with dredged material to expand water-oriented recreational area; and, 3) a Dredged Material Management Plan (DMMP) for the disposal of new work and maintenance materials. All of these proposed improvements are shown on the maps provided as Enclosure 1. The location of these improvements corresponds to the area of potential effects (APE).

Most, but not all, of the APE has been surveyed for historic properties (Jones et al. 2002; Gearhart et al. 2005; Enright et al. 2005; Gearhart et al 2006). These reports can be provided to you upon request. The reports summarize historical research, nautical remote-sensing surveys and dive assessments which located a shipwreck which has been identified as the remains of the *USS Westfield* (41GV151). The *USS Westfield* is a U.S. Navy flagship that ran aground during the Battle of Galveston and was scuttled to prevent capture on January 1, 1863. We believe that evidence provided in the reports support a determination of eligibility under National Register criteria A, B, and D (36 CFR 60).

The CE proposes negotiation of a PA which outlines procedures to be followed to complete identification, evaluation and assessment investigations of the area of potential effects, and to address adverse effects to the wreck of the *USS Westfield*. This is the only eligible historic property that has been identified to date in the APE. The *USS Westfield* will be adversely affected by channel deepening as the wreck is situated partially within the navigation channel proposed for deepening. Avoidance is not possible because the location of the channel is controlled by existing jetties.

We are proposing a four-party PA (Enclosure 2), to be negotiated among the CE, the City of Texas City (City), the U.S. Naval Historical Center (NHC), and the Texas State Historic Preservation Office (SHPO). The draft PA is being coordinated concurrently with all consulting parties and the Advisory Council on Historic Preservation (ACHP). The intent of the PA is to avoid or mitigate impacts to historic properties in areas directly affected by new dredging and channel construction, construction staging and access areas, new or extensions of existing placement areas, areas affected by the beneficial uses of dredged material, and ongoing maintenance dredging activities relate to the TCC and to guide the development of a Treatment Plan for the remains of the *USS Westfield* to resolve adverse effects in accordance with 36 CFR 800.6.

In summary, the CE requests your review of the enclosed PA. Please provide a copy of your comments to all of the consulting parties (addresses provided below). Upon receipt of your comments and finalization of the draft PA in consultation with your office, the City and the SHPO, the CE will coordinate a final draft PA with interested Native American Indian tribes in accordance with 36 CFR 800.3 (f)(2). Public coordination required by § 800.3 (a) will be accomplished by inclusion of the final draft PA in the Draft EA, which will be made available for public review and comment. If you have any questions, please don't hesitate to call Ms. Nicole Minnichbach at 409-766-3878.

Sincerely,

Carolyn Murphy

Carolyn Murphy
Chief, Environmental Section

Enclosures:
1 Maps
2 Draft PA

CC w/o Enclosures

James E. Bruseth, Ph.D.
Deputy State Historic
Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

Mayor Matthew T. Doyle
CC at same address Mr. Douglas Hoover
The City of Texas City
1801 9th Avenue North
P.O. Drawer 2608
Texas City, TX 77592-2608

Mr. Don Klima
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue, NW, Suite 803
Washington, DC 20004

Ms. Janelle Stokes
CESWG-PE-PR

Ms. Nikki Minnichbach
CESWG-PE-PR

References

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DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229
DECEMBER 15, 2006

Environmental Section

James E. Bruseth, Ph.D.
Deputy State Historic
Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

Dear Dr. Bruseth:

The US Army Corps of Engineers, Galveston District (CE), proposes to initiate a Programmatic Agreement (PA) pursuant to 36CFR800.6 and 36CFR800.14 (b)(3) to address impacts associated with improving navigation on the existing Texas City Channel, Galveston County, Texas. A Draft Environmental Assessment (EA) of the proposed improvements is planned to be released for public comment in late December, 2006. We find it necessary to negotiate a programmatic agreement because effects on historic properties cannot be fully determined prior to approval of this complex undertaking.

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Most, but not all, of the APE has been surveyed for historic properties (Jones et al. 2002; Gearhart et al. 2005; Enright et al. 2005; Gearhart et al 2006). These reports have already been provided to you. The reports also summarize historical research, nautical remote-sensing surveys and dive assessments which located a shipwreck which has been identified as the remains of the *USS Westfield* (41GV151). The *USS Westfield* is a U.S. Navy flagship that ran aground during the Battle of Galveston and was scuttled to prevent capture on January 1, 1863. We believe that evidence provided in the reports support a determination of eligibility under National Register criteria A, B, and D (36 CFR 60) and request your concurrence in this determination pursuant to 36 CFR 63.

The CE proposes negotiation of a PA which outlines procedures to be followed to complete identification, evaluation and assessment investigations of the area of potential effects, and to address adverse effects to the wreck of the *USS Westfield*. This is the only eligible historic property that has been identified to date in the APE. The *USS Westfield* will be adversely affected by channel deepening as the wreck is situated partially within the navigation channel proposed for deepening. Avoidance is not possible because the location of the channel is controlled by existing jetties.

We are proposing a four-party PA (Enclosure 2), to be negotiated among the CE, the City of Texas City (City), the U.S. Naval Historical Center (NHC), and the Texas State Historic Preservation Office (SHPO). The draft PA is being coordinated concurrently with all consulting parties and the Advisory Council on Historic Preservation (ACHP). The intent of the PA is to avoid or mitigate impacts to historic properties in areas directly affected by new dredging and channel construction, construction staging and access areas, new or extensions of existing placement areas, areas affected by the beneficial uses of dredged material, and ongoing maintenance dredging activities relate to the TCC and to guide the development of a Treatment Plan for the remains of the *USS Westfield* to resolve adverse effects in accordance with 36 CFR 800.6.

In summary, the CE requests your review of the enclosed PA. Please provide a copy of your comments to all of the consulting parties (addresses provided below). Upon receipt of your comments and finalization of the draft PA in consultation with your office, the City and the NHC, the CE will coordinate a final draft PA with interested Native American Indian tribes in accordance with 36 CFR 800.3 (f)(2). Public coordination required by § 800.3 (a) will be accomplished by inclusion of the final draft PA in the Draft EA, which will be made available for public review and comment. We also request your concurrence in our determination that the *USS Westfield* (41GV151) is eligible for the National Register of Historic Places under criteria A, B, and D. If you have any questions, please don't hesitate to call Ms. Nicole Minnichbach at 409-766-3878.

Sincerely,

Carolyn Murphy

Carolyn Murphy
Chief, Environmental Section

Enclosures:
1 Maps
2 Draft PA

CC w/o Enclosures

Ms. Barbara Voulgaris
The Naval Historical Center
805 Kidder Breese St., SE
Washington Navy Yard, DC 20374-5060

Mayor Matthew T. Doyle
CC at same address Mr. Douglas Hoover
The City of Texas City
1801 9th Avenue North
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Advisory Council on Historic Preservation
Office of Federal Agency Programs
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1100 Pennsylvania Avenue, NW, Suite 803
Washington, DC 20004

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Ms. Nikki Minnichbach
CESWG-PE-PR

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Preserving America's Heritage

JAN 03 2007

December 29, 2006

Ms. Carolyn Murphy
Chief, Environmental Section
Department of the Army
Galveston District, Corps of Engineers
P.O. Box 1229
Galveston, TX 77553-1229

REF: Proposed Texas City Channel Project
Galveston County, Texas

Dear Ms. Murphy:

On December 18, 2006, the ACHP received your notification and supporting documentation regarding the adverse effects of the referenced project on properties listed on and eligible for listing on the National Register of Historic Places. Based upon the information you provided, we do not believe that our participation in consultation to resolve adverse effects is needed. However, should circumstances change and you determine that our participation is required, please notify us. Pursuant to 36 CFR 800.6(b)(iv), you will need to file the final Memorandum of Agreement and related documentation at the conclusion of the consultation process. The filing of the Agreement with us is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with your notification of adverse effect. If you have any questions or require further assistance, please contact Tom McCulloch at 202-606-8554, or via email at tmcculoch@achp.gov.

Sincerely,

Raymond V. Wallace

Raymond V. Wallace
Historic Preservation Technician
Federal Property Management Section
Office of Federal Agency Programs

January 23, 2007

Ms. Carolyn Murphy
Chief, Environmental Section
Galveston District, Corps of Engineers
P.O. Box 1229
Galveston, TX 77553-1229

RE: Project review under Section 106 of the National Historic Preservation Act of 1966 and the Antiquities Code of Texas
Draft Programmatic Agreement for Construction and Maintenance of the 45-foot Project, Texas City Channel, Galveston County, Texas.
COE-VD

Dear Ms. Murphy:

Thank you for your correspondence describing the above referenced PA. This letter serves as comment from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission. As the state agency responsible for administering the Antiquities Code of Texas, these comments also provide recommendations on compliance with state antiquities laws and regulations.

We have reviewed the draft PA referenced above find it acceptable without further comment. We also concur that the USS *Westfield* (41GV151) is eligible for the National Register of Historic Places under criteria A, B, and D.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this federal and state review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Steve Hoyt at 512/463-7188.**

Sincerely,

Steve D Hoyt

for F. Lawerence Oaks, State Historic Preservation Officer

cc: Ms Barbara Voulgaris, Naval Historical Center
Mayor Matthew T. Doyle, The City of Texas City
Mr. Douglas Hoover, The City of Texas City
Mr. Don Klima, Advisory Council on Historic Preservation
✓Ms. Janelle Stokes, US Army Corps of Engineers, Galveston District
Ms. Nikki Minnichbach, US Army Corps of Engineers, Galveston District

DEPARTMENT OF THE NAVY
NAVAL HISTORICAL CENTER
805 KIDDER BREESE STREET SE
WASHINGTON NAVY YARD DC 20374-5060

IN REPLY REFER TO

5000
Ser FO/00013
February 15, 2007

Ms. Carolyn Murphy
Chief, Environmental Section
Galveston District, Army Corps of Engineers
P.O. Box 1229
Galveston, TX 77553-1229

Dear Ms. Murphy:

I am writing in response to your letter dated December 15, 2006, requesting comments on the draft programmatic agreement (PA) for the Construction and Maintenance of the 45-foot Project, Texas City Channel, Galveston County, Texas. This letter serves as comment from the U.S. Navy, Naval Historical Center, the Navy command responsible for the management of the U.S. Navy's historic ship and aircraft wrecks.

It has been determined that the Civil War shipwreck USS *Westfield* (41GV151), a historic property under the jurisdiction of the U.S. Navy, will be adversely affected by this undertaking. We agree with the findings that *Westfield* is eligible for listing on the National Register under criteria A, B, and D. We have reviewed the PA and find it sufficient in addressing the adverse affects on *Westfield* and therefore have no further comment.

We look forward to continuing our partnership throughout the consultation process in order to preserve this important piece of history for Texas, the U.S. Navy, and the nation. Thank you for the opportunity to review the draft PA. If you have any questions please contact Ms. Barbara Voulgaris at 202-433-7562.

Sincerely,

P. O. WHEELER
Captain, U.S. Navy
Deputy Director of Naval History

Copy to:
Mr. Steve Hoyt, Texas Historical Commission
Mayor Matthew Doyle, The City of Texas City
Mr. Douglas Hoover, The City of Texas
Mr. Don Klima, Advisory Council on Historic Preservation
Ms. Janelle Stokes, USACE, Galveston District
Ms. Nikki Minnichbach, USACE, Galveston District

THE CITY OF TEXAS CITY

MATTHEW T. DOYLE
Mayor

OFFICE OF THE MAYOR

April 2, 2007

Ms. Carolyn Murphy, Chief of Environmental
U.S. Army Corps of Engineers, Galveston District
P.O. Box 1229
Galveston, Texas 77553-1229

Re: Programmatic Agreement (PA)
Texas City Ship Channel
Galveston County, Texas

Dear Ms. Murphy,

Regarding the December 15, 2006 draft of the Programmatic Agreement (PA) for the Construction and Maintenance of the Texas City Channel 45-foot Project, Texas City Channel, Galveston County, Texas, we have reviewed the draft PA and find it acceptable without further comment.

Your cooperation is greatly appreciated and we look forward to continuing our partnership throughout the consultation process.

Respectfully,

Matthew T. Doyle
Mayor

Cc: Sharon Tirpak
Doug Hoover

1801 - 9th Avenue North • P.O. Drawer 2608 • Texas City, Texas 77592-2608 • Phone (409) 643-5902 • FAX (409) 949-3090
E-MAIL: mayor-tx@texas-city-tx.org • http://www.texas-city-tx.org

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

MAY 0 1 2007

Executive Office

Mr. F. Lawerence Oaks
State Historic Preservation Officer
Texas Historical Commission
108 West 16th Street
Austin, TX 78771-2276

Rear Admiral Paul E. Tobin, USN (Retired)
Director of Naval History
The Naval Historical Center
805 Kidder Breese St., SE
Washington Navy Yard, DC 20374-5060

Mr. Matthew T. Doyle
Mayor of the City of Texas City
Office of the Mayor
The City of Texas City
1801 9th Avenue North
Texas City, TX 77592-2608

Dear Signatories:

The US Army Corps of Engineers, Galveston District is pleased to enclose for your signature, signed copies of the Programmatic Agreement (PA) for the management of historic properties including the USS *Westfield* that may be affected by the construction and maintenance of the proposed Texas City Channel 45-foot Project, Texas City Channel, Galveston County, Texas.

I greatly appreciate your time and effort in working with us to negotiate this agreement. To expedite the finalization of the PA, we request that each signatory sign each of the four copies of the PA and send them by next day delivery to the next signatory as indicated above. The City, as the final signatory, is requested to retain one fully executed original and send the remaining three originals of the PA to the USACE for final distribution. Signatories will receive a fully executed original of the document for their records.

Please contact Ms. Nikki Minnichbach at 409-766-3878 if you have any questions concerning this request. Again, thank you for your cooperation in this coordination.

Sincerely,

David C. Weston
Colonel, Corps of Engineers
District Commander

Enclosures

CF w/out encls:

Dr. James E. Bruseth
Deputy State Historic Preservation Officer
Texas Historical Commission
108 West 16th Street
Austin, TX 78771-2276

Ms. Barbara Voulgaris
The Naval Historical Center
805 Kidder Breese St., SE
Washington Navy Yard, DC 20374-5060

Mr. Douglas Hoover
The City of Texas City
1801 9th Avenue North
P.O. Drawer 2608
Texas City, TX 77592-2608

CESWG-PE-PR, K. Morten
CESWG-PE-PL, J. Walsdorf
CESWG-PM, S. Tirpak

Texas City Channel Deepening Project
General Reevaluation Report and
Environmental Assessment
October 2007

Appendix K
Signed Cultural Resources Programmatic Agreement

PROGRAMMATIC AGREEMENT
REGARDING COMPLIANCE WITH SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT
FOR
CONSTRUCTION AND MAINTENANCE OF THE 45-FOOT PROJECT
TEXAS CITY CHANNEL,
GALVESTON COUNTY, TEXAS
AMONG
THE U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT,
THE UNITED STATES NAVY, NAVAL HISTORICAL CENTER,
THE TEXAS STATE HISTORIC PRESERVATION OFFICER,
AND
THE CITY OF TEXAS CITY

WHEREAS, the U.S. Army Corps of Engineers, Galveston District (CE) has determined that construction and maintenance of the proposed 45-foot Texas City Channel project (hereinafter, "undertaking") will have an adverse effect on the National Register-eligible wreck of the *USS Westfield*, also known as site 41GV151, and may have an effect on other properties eligible for inclusion in the National Register of Historic Places (NRHP) (hereinafter, "historic properties) pursuant to Section 106 of the National Historic Preservation Act (16.U.S.C § 470) (hereinafter NHPA) and its implementing regulation, "Protection of Historic Properties," (36 CFR 800); and

WHEREAS, the existing 40-foot Texas City Channel Project (TCC) was authorized on October 12, 1972 by Section 201 of Public Law (P.L.) 89-298 (House Document 199, 92nd Congress, 2nd Session) and a 50-foot channel and other navigation improvements were authorized on November 17, 1986 by Section 201 of P.L. 99-662 (Water Resources Development Act of 1986); and

WHEREAS, the City of Texas City (the City) is the Non-Federal partner with the CE for this undertaking and is providing all lands, easements, rights-of-way, relocations, removals, and upland placement areas necessary for the project construction and operation; and

WHEREAS, the U.S. Naval Historical Center (NHC) is the official history program of the United States Department of the Navy (Navy) and the Navy retains ownership of the remains of the *USS Westfield*; and

WHEREAS, the NHC and the Texas State Historic Preservation Office (SHPO) recognize a mutual interest in the protection of sunken historic Navy vessels and have entered into a programmatic agreement for a cooperative partnership with the goals of managing, protecting, and preserving the Navy submerged historic resources within Texas; and

WHEREAS, the need to complete the inventory and evaluation of historic properties for the proposed undertaking and the treatment of the National Register-eligible *USS Westfield* make it necessary to defer completion of historic properties investigations until approval and funding of proposed improvements is obtained; and

WHEREAS, the CE, the NHC, the SHPO and the City agree that it is advisable to accomplish compliance with Section 106 through the development and execution of this Programmatic Agreement (PA) in accordance with § 800.6 and § 800.14(b)(3); and

WHEREAS, the CE has invited the Advisory Council on Historic Preservation (Council) to determine whether the Council wishes to enter into the Section 106 process; and

NOW, THEREFORE, the CE, the NHC, the SHPO and the City agree that the proposed undertaking shall be implemented in accordance with the following stipulations in order to take into account the effects of the undertaking on historic properties and to satisfy the CE's Section 106 responsibilities for all individual aspects of the undertaking.

Stipulation I

Identification, Evaluation, Effect Determination and Resolution

A. *Scope of Undertaking*. This PA shall be applicable to all new construction activities related to the proposed undertaking and activities related to maintenance dredging. The Area of Potential Effects (APE) shall be established by the CE in consultation with the SHPO and shall include all areas to be directly affected by new dredging and channel construction, construction staging and access areas, new or extensions of existing placement areas, ecological mitigation features, areas affected by the beneficial uses of dredged material, and ongoing maintenance dredging activities related to the TCC project.

B. *Qualifications and Standards*. The CE shall ensure that all work conducted in conjunction with this PA is performed in a manner consistent with the Secretary of Interior's "Standards and Guidelines for Archeology and Historic Preservation (48 Federal Register 44716-44740; September 23,1983), as amended, or the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68), as appropriate.

C. *Definitions.* The definitions set forth in § 800.16 are incorporated herein by reference and apply throughout this PA.

D. *Identification of Historic Properties*. Prior to the initiation of construction or maintenance activities, the CE shall make a reasonable and good faith effort to identify historic properties located in the APE. These steps may include, but are not limited to, background research, consultation, oral history interviews, sample field investigation, and field survey. The level of effort for these activities shall be determined in consultation with the SHPO and any Native American Indian tribe that attaches religious and cultural significance to identified properties. If no historic properties are identified in the APE, the CE shall document this finding pursuant to § 800.11(d) and retain this documentation in CE files for at least seven (7) years.

E. *Evaluation of National Register Eligibility.* If historic properties are identified within the APE, the CE shall determine their eligibility for the National Register of Historic Places in accordance with the process described in § 800.4(c) and criteria established in 36 CFR 60. The determination of cultural significance shall be conducted in consultation with the SHPO and Native American Indian tribes that attach religious and cultural significance to identified properties, and with the Navy for historic properties owned by the Navy. Should the CE and the SHPO agree that a property is or is not eligible, such consensus shall be deemed conclusive for the purpose of the PA. Should the CE and SHPO not agree regarding the eligibility of a property, the CE shall obtain a determination of eligibility from the Keeper of the National Register pursuant to 36 CFR 63.

F. *Assessment of Adverse Effects.*

1. *No Historic Properties Affected.* The CE shall make a reasonable and good faith effort to evaluate the effect of each undertaking on historic properties in the APE. The CE may conclude that no historic properties are affected by an undertaking if no historic properties are present in the APE, or the undertaking will have no effect as defined in §800.16(i). This finding shall be documented in compliance with § 800.11(d) and the documentation shall be retained by the CE for at least seven (7) years and provided to the SHPO upon request. The CE shall provide information on the finding to the public upon request, consistent with the confidentiality requirements of § 800.11(c).

2. *Finding of No Adverse Effect.* The CE, in consultation with the SHPO and Native American Indian tribes that attach religious and cultural significance to identified historic properties, shall apply the criteria of adverse effect to historic properties within the APE in accordance with § 800.5. The CE may propose a finding of no adverse effect if the undertaking's effects do not meet the criteria of § 800.5(a)(1) or the undertaking is modified to avoid adverse effects in accordance with 36 CFR 68. The CE shall provide to the SHPO documentation of this finding meeting the requirements of § 800.11(e). The SHPO shall have 30 calendar days in which to review the findings and provide a written response to the CE. The CE may proceed upon receipt of written concurrence from the SHPO. Failure of the SHPO to respond within 30 days of receipt of the finding shall be considered agreement with the finding. The CE shall maintain a record of the finding and provide information on the finding to the public upon request, consistent with the confidentiality requirements of § 800.11(c).

3. *Resolution of Adverse Effect.* If the CE determines that the undertaking will have an adverse effect on historic properties as measured by criteria in § 800.5.(a)(1), the agency shall consult with the SHPO and Native American Indian tribes that attach religious and cultural significance to identified historic properties, and with the Navy if the historic property is owned by the Navy, to resolve adverse effects in accordance with § 800.6.

a. For historic properties that the CE and SHPO agree will be adversely affected, the CE shall:

1) Consult with the SHPO to identify other individuals or organizations to be invited to become consulting parties. If additional consulting parties are identified, the CE shall provide them copies of documentation specified in § 800.11(e) subject to confidentiality provisions of § 800.11(c).

2) Afford the public an opportunity to express their views on resolving adverse effects in a manner appropriate to the magnitude of the project and its likely effects on historic properties.

3) Consult with the SHPO, the Navy, the City and Native American tribes which have indicated an interest in the undertaking, and consulting parties to seek ways to avoid, minimize or mitigate adverse effects.

4) The CE, in consultation with SHPO, Navy, and other consulting parties as appropriate, shall prepare an historic property treatment plan which describes mitigation measures the CE proposes to resolve the undertaking's adverse effects and provide this plan for review and comment to the SHPO, consulting parties, Native American tribes that have indicated an interest in the undertaking, and the Navy if the treatment plan involves Navy property. All parties shall have 30 calendar days in which to provide a written response to the CE.

b. If the CE and SHPO fail to agree on how adverse effects will be resolved, the CE shall request that the Council join the consultation and provide the Council with documentation pursuant to § 800.11(g).

1) If the Council agrees to join the consultation, the CE shall proceed in accordance with § 800.9

2) If, after consulting to resolve adverse effects pursuant to Stipulations I or II of this PA, the Council, CE or SHPO determines that further consultation will not be productive, then any party may terminate consultation in accordance with the notification requirement and process prescribed by § 800.7.

Stipulation II

Post Review Changes and Discoveries

A. *Changes in the Undertaking.* If construction on the undertaking has not commenced and the CE determines that it will not conduct the undertaking as originally coordinated, the CE shall reopen consultation pursuant to Stipulation I E – F.

B. *Unanticipated Discoveries or Effects.* Pursuant to § 800.13(a)(2), if historic properties are discovered or unanticipated effects on historic properties are found after construction on an undertaking has commenced, the CE shall develop a treatment plan to resolve adverse effects and notify the SHPO, Native American Tribes that might attach religious and cultural significance to the affected property, and the Navy if it is Navy property within 48 hours of the discovery. The notification shall include the CE assessment of National Register eligibility of affected properties and proposed actions to resolve the adverse effects. Comments received from the SHPO, Navy and/or Native American tribes within 48 hours of the notification shall be taken into account by the CE in carrying out the proposed treatment plan. The CE may assume SHPO concurrence in its eligibility assessment unless otherwise notified by the SHPO. The CE shall provide the SHPO, the Navy and Native American tribes which have expressed an interest in the undertaking a report of the CE actions when they are completed.

Stipulation III

Treatment Plan for 41GV151, the *USS Westfield*

The CE, in consultation with the signatories, shall prepare a Treatment Plan (Plan) for the remains of the *USS Westfield* resources to resolve adverse effects in accordance with § 800.6. The Plan shall include, but not be limited to, procedures for additional archival research, survey, inventory, evaluation, recordation, recovery and conservation for resources eligible for the NRHP. The Plan will be submitted to the signatories for review and approval prior to any additional investigations on the *USS Westfield*. The Plan shall include, but not be limited to the following:

A. *Inventory and Evaluation.* Additional inventory and evaluation of the *USS Westfield* shall be conducted to systematically document the extent and contents of the assemblage. The goal of the additional investigations is to identify the full extent of the remains, define specific research questions and formulate a plan for data recovery.

1. *Archival Research.* Archival research shall be conducted to obtain background information adequate to develop an effective research design and to provide a basis for the evaluation and interpretation of identified artifacts associated with the *USS Westfield*. Information gathered during this research and prior dive assessments will be used to clarify research questions and develop a research plan for the controlled surface collection and recordation/conservation strategies.

2. *Marine Survey.* Research has determined that the channel bottom adjacent to the *USS Westfield* has not been dredged; therefore, a marine remote-sensing survey shall be conducted on the channel bottom from toe-to-toe adjacent to the *USS Westfield*. The survey area shall be determined by the CE and coordinated with the SHPO and the NHC.

3. *Dive Assessment of Survey Results.* A dive assessment on sensitive anomalies and/or sonar targets shall be conducted to assess their possible association with the wreck of the *USS Westfield* and their significance.

4. *Mapping.* A dive investigation shall be conducted to systematically map the artifact assemblage of the *USS Westfield.*

B. *Data Recovery.* Information gathered during all previous investigations, inventory and mapping shall be used to create a data recovery plan. This plan shall incorporate and conform requirements of the Explosive Ordnance Disposal (EOD) Plan which will be developed by Department of Defense ordnance experts. The data recovery plan shall include a methodology for recovering *USS Westfield* artifacts, and for determining which artifacts shall be: 1) recovered, recorded, and returned to a nearby marine environment; or 2) recovered, recorded and conserved. The CE shall provide the data recovery plan to the SHPO, the NHC and other consulting parties that have indicated an interest in the undertaking for review and comment. All parties shall have 30 calendar days in which to provide a written response to the CE. The CE may proceed upon receipt of written concurrence from the SHPO and the NHC. Failure of the SHPO or the NHC to respond within 30 days of receipt of the finding shall be considered agreement with the data recovery plan.

C. *Conservation, Disposition and Public Interpretation of USS Westfield Artifacts.* The CE shall prepare a plan for the curation, conservation, disposition and public interpretation of artifacts recovered from the *USS Westfield* and provide this plan to the SHPO, the NHC and other consulting parties that have indicated an interest in the undertaking for review and comment. All parties shall have 30 calendar days in which to provide a written response to the CE. The CE may proceed upon receipt of written concurrence from the SHPO and the NHC. Failure of the SHPO or the NHC to respond within 30 days of receipt of the finding shall be considered agreement.

Stipulation IV

Curation and Disposition of Artifacts and Records

The CE shall ensure that all archeological materials and associated records owned by the Navy or State which are recovered and conserved as a result of the identification, evaluation, and treatment efforts conducted under this PA, shall be transported and accessioned into a suitable university, museum, or other scientific or educational institution that meets the standards of 36 CFR 79. Copies of associated archaeological records and data shall be made available to the Navy and SHPO upon request. Artifacts associated with the *USS Westfield* site remain the property of the United States. Artifacts from the *USS Westfield* site that are conserved and curated, shall be accessioned into the Navy's collection. Archeological items and materials from privately-owned lands shall be returned to their owners upon completion of analyses required for Section 106 compliance under this PA. Navy artifacts that are exhibited in a suitable venue in Texas or elsewhere shall be accessioned into the Navy's collection and loaned to that institution by the Navy per 10 USC 2572 and 7545, 36 CFR Part 79 and Department of Defense and Navy regulations.

Stipulation V
PA Amendments, Disputes and Termination

A. *Amendments.* Any party to this PA may propose to the other parties that it be amended, whereupon the parties will consult in accordance with § 800.6(c)(7) to consider such an amendment.

B. *Disputes.* Disputes regarding the completion of the terms of this agreement shall be resolved by the signatories. If the signatories cannot agree regarding a dispute, any one of the signatories may request the participation of the ACHP in resolving the dispute in accordance with the procedures outlined in § 800.9.

C. *Termination of PA.* Any party to this PA may terminate it by providing sixty (60) days notice to the other parties, provided that the parties will consult during the period prior to the termination to seek agreement on amendments or other actions that will avoid termination. In the event of termination of this PA by the SHPO, the CE shall comply with the provisions of § 800 Subpart B.

Stipulation VI
Termination of Consultation

If, after consulting to resolve adverse effects pursuant to Stipulation I or II of this PA, the CE or SHPO determines that further consultation will not be productive, then either party may terminate consultation in accordance with the notification requirements and process prescribed by § 800.7

Stipulation VII
Term of this Agreement

This PA remains in force for a period of ten (10) years from the date of its execution by all signatories. Sixty (60) days prior to the conclusion of the ten (10) year period, the CE will notify all parties in writing of the end of the ten year period to determine if they have any objections. If there are no objections received prior to expiration, the PA will continue to remain in force for a new ten (10) year period.

DISTRICT ENGINEER, U.S. ARMY CORPS OF ENGINEERS, GALVESTON

1 MAY 2007

David C. Weston, Colonel, District Commander **Date**

TEXAS STATE HISTORIC PRESERVATION OFFICER

5/3/07

F. Lawerence Oaks, Texas State Historic Preservation Officer **Date**

NAVAL HISTORICAL CENTER

5/15/07

Rear Admiral Paul E. Tobin, USN (Retired), Director of Naval History **Date**

THE CITY OF TEXAS CITY

5/21/07

Matthew T. Doyle, Mayor of the City of Texas City **Date**

Texas City Channel Deepening Project
General Reevaluation Report and
Environmental Assessment
October 2007

Appendix L
Finding of No Significant Impact (FONSI)

STATEMENT OF FINDINGS
AND
FINDING OF NO SIGNIFICANT IMPACT
FOR THE
TEXAS CITY CHANNEL DEEPENING PROJECT

Project History
The Water Resources Development Act (WRDA) of 1986 authorized a project depth of 50 feet and width of 600 feet for the Texas City Channel. In 2001, the non-Federal sponsor, the City of Texas City, expressed an interest in pursuing Federal construction of the Texas City Channel Project to a depth of 45 feet while maintaining the existing project width of 400 feet. This request was made in conjunction with the sponsor's application for a United States Army Corps of Engineers (USACE) Permit No. 21979 for the Shoal Point Container Terminal Project (SPCT). The 2002 Environmental Impact Statement (EIS) for the permit addressed deepening the channel to 45 feet.

Purpose
This document addresses potential impacts of the proposed Texas City Channel Deepening Project not addressed in the 2002 SPCT EIS, including deepening the Texas City Turning Basin to 45 feet, widening of a 3,000-foot section of the channel for bend-easing, and construction of two, 500-foot groins and a new placement area (PA) on the north side of the Texas City Dike. It was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality (CEQ) regulations to document findings concerning the environmental impacts of the proposed action. This Environmental Assessment (EA) has been prepared consistent with the provisions of 33 CFR 230.7(b) since the project changes may be approved under the discretionary authority of the Secretary of the Army. The final EA updates overall project information and coordination to ensure that all environmental compliance is current. In addition, the final EA incorporates by reference data and information from the SPCT EIS that pertain to the Texas City Channel Deepening Project.

Proposed Action
The Texas City Channel Deepening Project proposes to deepen the channel and turning basin from 40 feet to 45 feet, ease a bend in the channel, construct five semi-confined bay placement areas (SPPA 2-5 and Pelican Island PA), utilize two semi-confined (SPPA 1 and 1A) and two upland PAs (PA 5 and 6) provided by the non-Federal Sponsor for project maintenance, utilize two existing PAs (PA 2A and 2B) on the north side of the Texas City Dike, and construct two, 500-foot groins on the north side of the Texas City Dike, creating a third placement area (PA 2C). Maintenance material will be used beneficially to create approximately 1,000 acres of emergent marsh in seven semi-confined bay placement areas. The work plan is the result of a project reevaluation study, which is documented in a General Reevaluation Report (GRR). Several alternatives to the proposed action were evaluated, including the No-Action Alternative. Other

evaluated alternatives included varying channel depths and associated heights of confinement levees for marsh creation sites.
The Recommended Plan, also known as the Locally Preferred Plan (LPP), was selected as best meeting the project objectives and requirements.

Coordination
A public scoping meeting was held June 22, 2004 to solicit public input for the proposed project. A Notice of Availability was issued to interested parties, including Federal and state agencies, on January 16, 2007 that described the proposed action and announced the availability of the Draft General Reevaluation Report and Environmental Assessment for the Texas City Channel Deepening Project. Six responses were received from state and Federal resource agencies and the Choctaw Nation of Oklahoma, and are included in the EA.

The Texas Commission on Environmental Quality (TCEQ) Air Quality Division has determined that emissions from the proposed project will not exceed emissions from the Houston-Galveston-Brazoria (HGB) Area State Implementation Plan (SIP). In support of the national ambient air quality standards, the USACE will adopt pollution prevention and/or reduction measures for the proposed project such as those suggested in the TCEQ General Conformity Concurrence letter dated May 25, 2007, that are allowed by Federal regulation and policy.

By letter dated April 18, 2007, the TCEQ Water Quality Division concurred that the proposed project will not violate state water quality standards and issued a 401 water quality certification for the project.

The U.S. Fish and Wildlife Service (USFWS) submitted a Planning Aid Letter dated February 14, 2007 that recommended the proposed project adopt the SPCT Dredged Material Management Plan (DMMP) guidelines, which are incorporated by reference into the GRR and EA. In addition, USFWS concurred that the proposed project will have no effect on any federally listed species or critical habitat under their jurisdiction.

In a February 13, 2007 letter, the National Marine Fisheries Service (NMFS) concurred that although temporary impacts to federally managed species (shrimp and red drum) would occur during marsh cell construction, the creation of approximately 1,000 acres of new emergent marsh habitat would offset the temporary impacts and ultimately be beneficial to these species, provided the PAs are constructed in accordance with the SPCT DMMP. In a separate letter dated April 10, 2007, the NMFS concurred that the project will have no effect on any federally listed species or critical habitat under their jurisdiction.

The proposed project has been reviewed for consistency with the goals and policies of the Texas Coastal Management Program (CMP). In a letter dated February 27, 2007, the Coastal Coordination Council determined that the project is consistent with the Texas CMP.

The wreck of the USS *Westfield* is eligible for inclusion in the National Register of Historic Places and will be adversely impacted by the proposed project.
A Programmatic Agreement (PA) that addresses how the wreck will be investigated and mitigated has been executed by the following consulting parties: Galveston District, Texas State Historic Preservation Officer, Director of the Naval History Center, and the City of Texas City. The PA is included in the EA and achieves compliance with Section 106 of the National Historic Preservation Act.

Environmental Effects
The Recommended Plan and the No Action Alternative have been fully addressed in the EA. Galveston District has taken every reasonable measure to evaluate environmental, social, and economic impacts. These impacts are described in the EA. Based on the information presented in the EA and coordination with Federal, state, and local agencies, it has been determined that the Recommended Plan will have no significant impacts on the environment. There are no significant impacts to federally listed threatened or endangered species, land, water quality, wildlife, fisheries, and/or to the surrounding human population. The proposed project will not violate local air quality standards and conforms to the HGB Area SIP. No hazardous, toxic, or radioactive wastes will be generated by proposed construction. A Section 404 (b)(1) Evaluation (short form) of project impacts to water quality indicates the project will not adversely affect water quality. Impacts to the USS *Westfield* will be mitigated. There are no unresolved issues.

Determinations
My analysis of the environmental aspects of the proposed action is based on the accompanying EA. Factors considered in the review were impacts on social resources, wildlife and fisheries, water quality, threatened and endangered species, and historic resources, as well as alternative courses of action and cumulative impacts.

Findings
Based on my analysis of the EA and other information pertaining to the proposed project, I find that the proposed action will not have a significant impact on the quality of the human environment. As a result, I have determined that an environmental impact statement is not required under the provisions of NEPA, Section 102, and other applicable regulations of the Corps of Engineers and Council on Environmental Quality.

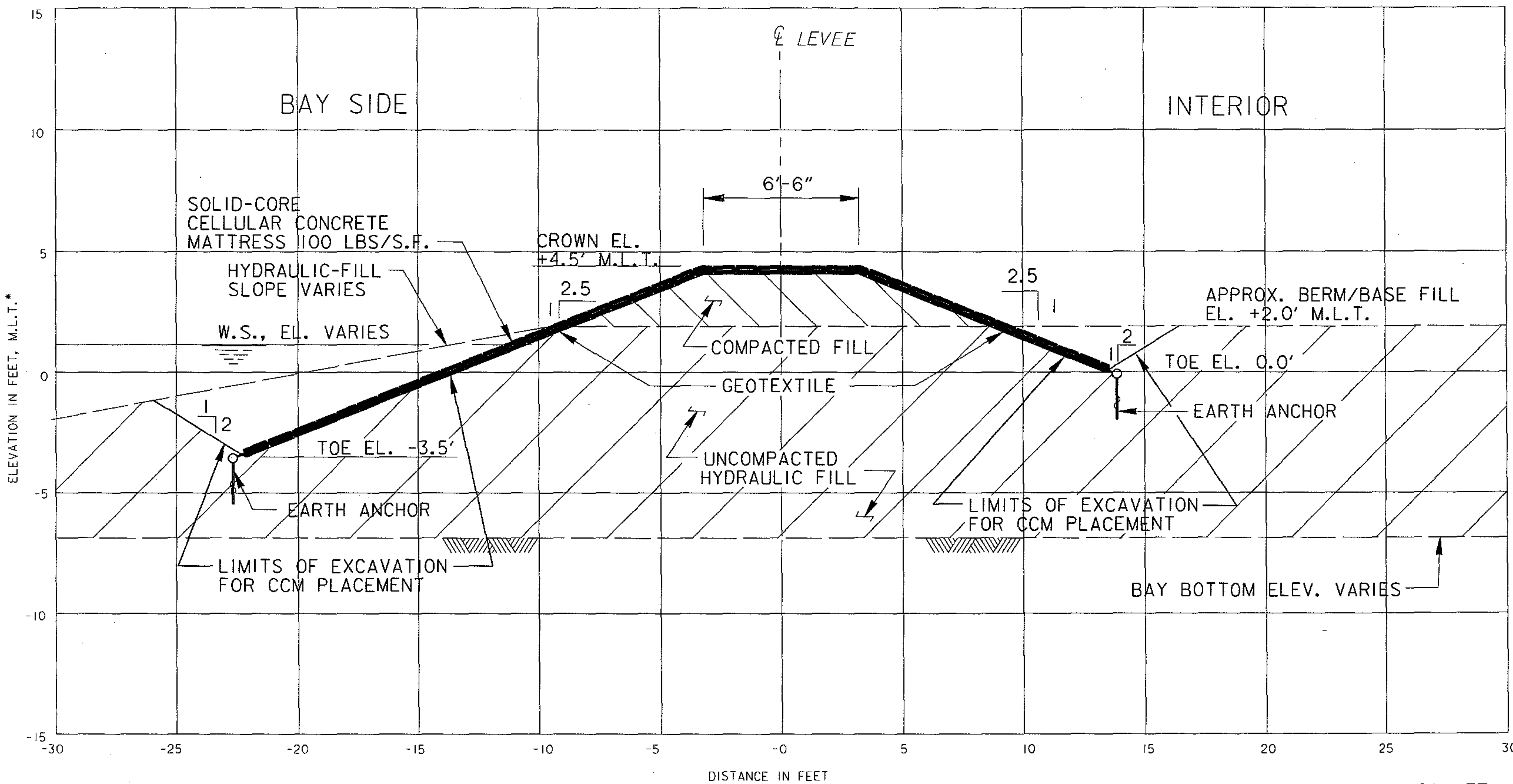
4 October 2007
Date

David C. Weston
Colonel, Corps of Engineers
District Commander

Texas City Channel Deepening Project
General Reevaluation Report and
Environmental Assessment
October 2007

Project Plates 1 - 11

* NOTE:
VERTICAL DATUM
MEAN LOW TIDE = 1.42' BELOW NAVD88
TIDAL EPOCH: 1983-2001



LENGTH: 5,000 FT.

TYPICAL SECTION
SOLID-CORE CELLULAR CONCRETE MATTRESS
FOR BUDM PLACEMENT AREAS
SPPA 3, SPPA 4 AND SPPA 5
STATION 158+000 TO STATION 37+00

SCALE: 1"=5'-0"

NOTES:

1. SEE PLATE 6 FOR PLAN VIEW OF BUDM PLACEMENT AREA AND LOCATION OF CCM.
2. CROSS SECTION IS SHOWN LOOKING TOWARDS INCREASING STATION.

GENERAL REEVALUATION STUDY
TEXAS CITY CHANNEL, TEXAS

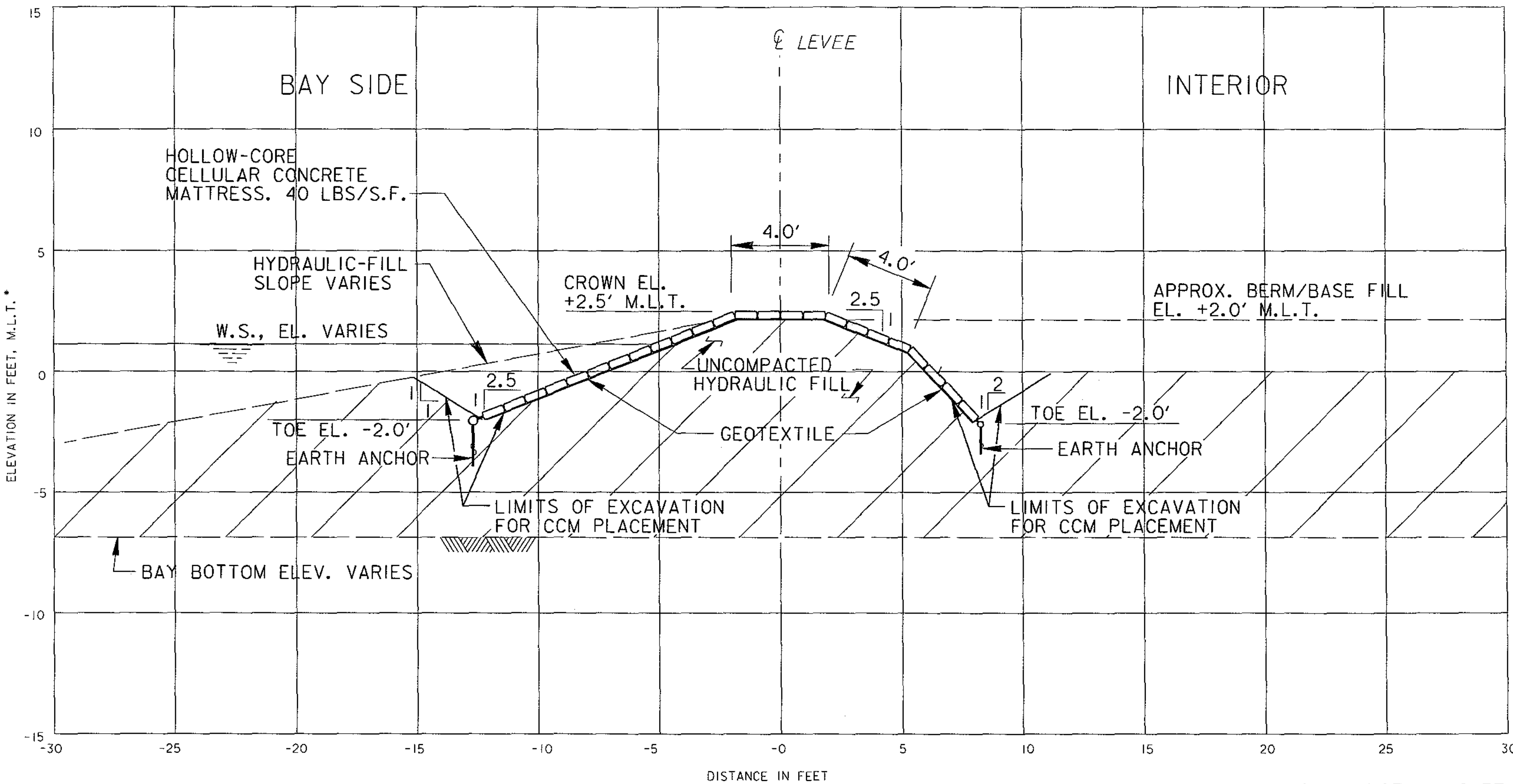
TYPICAL SECTION
SOLID-CORE CELLULAR
CONCRETE MATTRESS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS
DATED: JANUARY 2006

PLATE 9

...\plate09(SolidMats).dgn 1/25/2008 10:35:21 AM

* NOTE:
VERTICAL DATUM
MEAN LOW TIDE = 1.42' BELOW NAVD88
TIDAL EPOCH: 1983-2001



WEIR LENGTH: 100 FT.

NOTES:

1. SEE PLATE 6 FOR PLAN VIEW OF BUDM PLACEMENT AREA.
2. CROSS SECTION IS SHOWN LOOKING TOWARDS INCREASING STATION.

TYPICAL SECTION
WEIR
SPPA 3, SPPA 4 AND SPPA 5

STATIONS: 110+00 - 111+00
127+00 - 128+00
147+00 - 148+00

SCALE: 1"=5'-0"

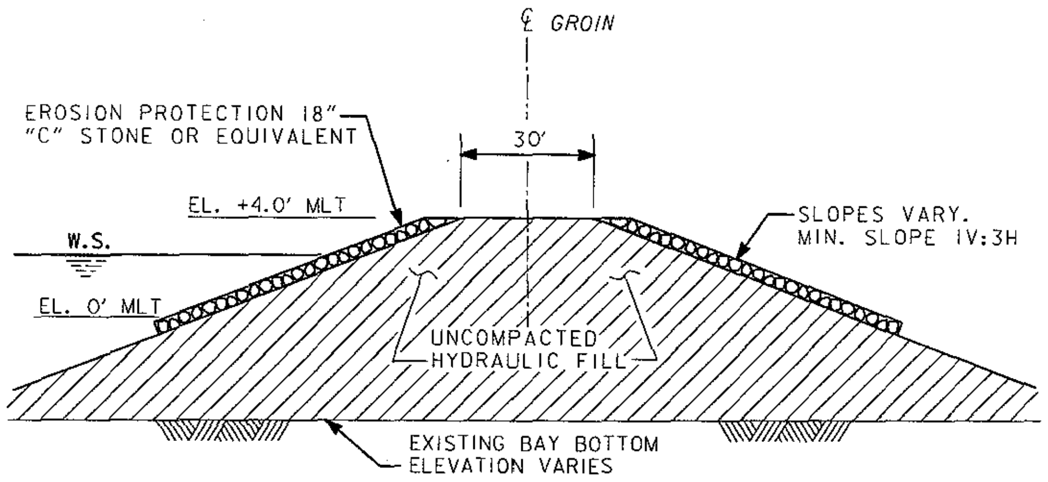
GENERAL REEVALUATION STUDY
TEXAS CITY CHANNEL, TEXAS

TYPICAL SECTION
WEIR

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS

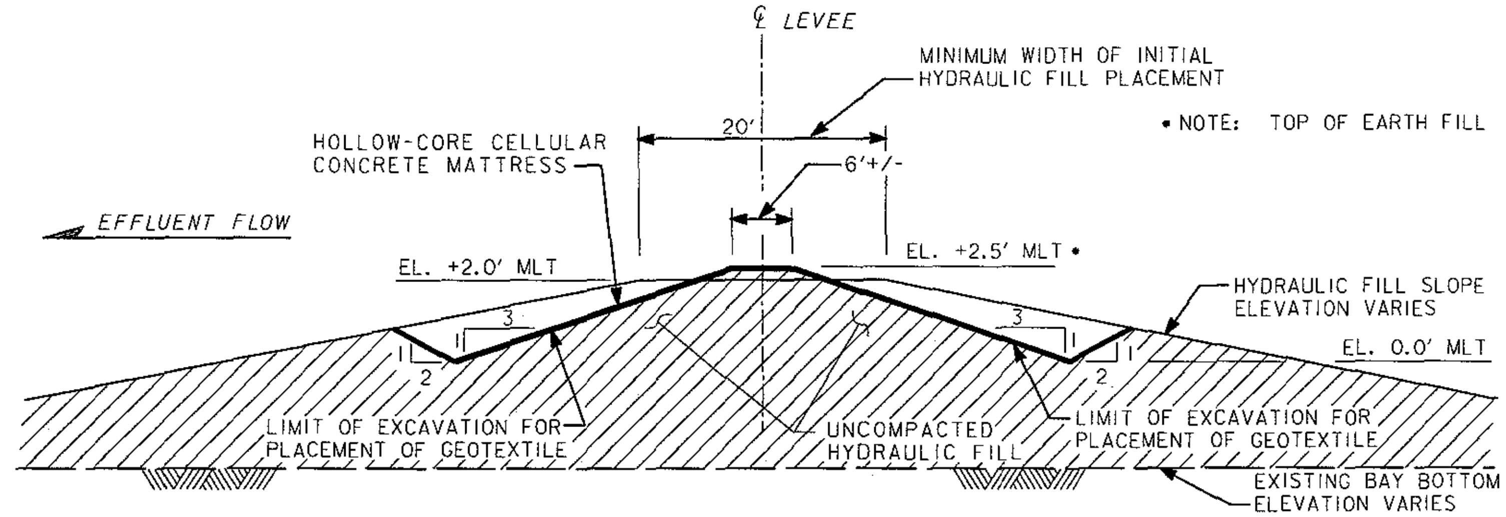
DATED: JANUARY 2006

PLATE 10



TYPICAL SECTION

GROINS "A" AND "B"

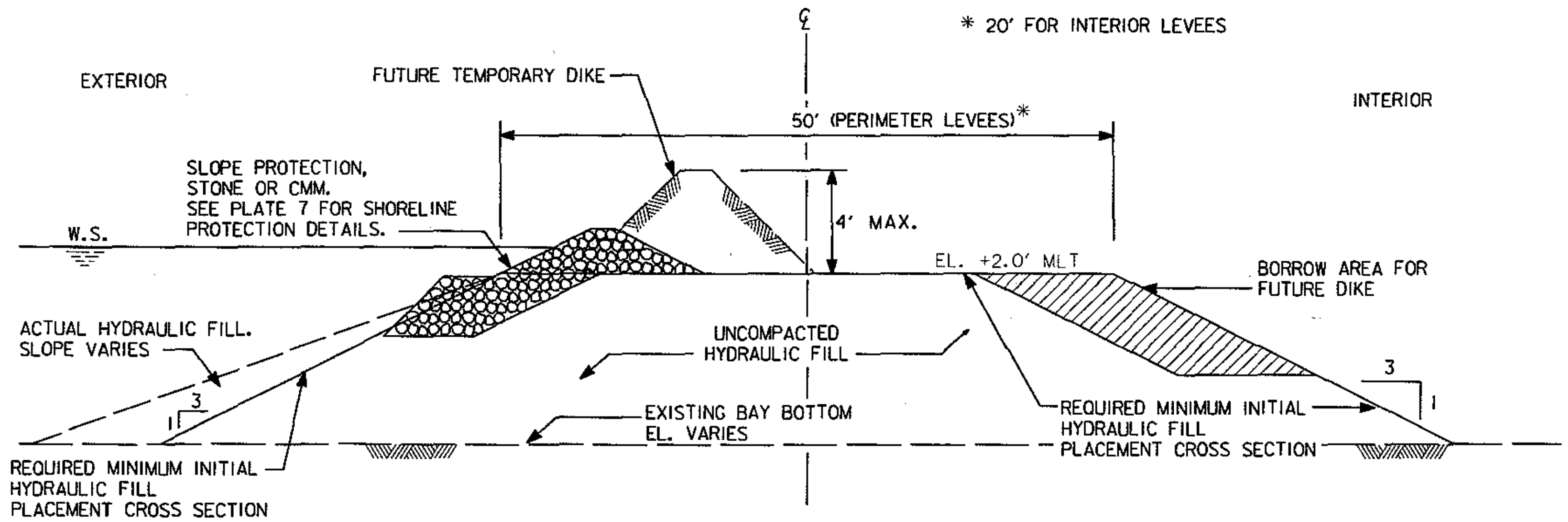


TYPICAL SECTION

SPPA 3, 4 AND 5

GEOTEXTILE-COVERED INTERIOR WEIRS

NOT TO SCALE



TYPICAL SECTION

SPPA 2-5 HYDRAULIC-FILL BERM / BASE

NOT TO SCALE

NOTES:

1. SEE PLAN VIEW ON PLATE 6 FOR ALIGNMENT OF HYDRAULIC-FILL BERM/BASE AND LOCATIONS OF WEIRS.
2. TYPICAL MINIMUM SECTION FOR INITIAL BERM/BASE PLACEMENT CONSISTS OF 50' CROWN OF MINIMUM ELEVATION OF +2.0' MLT (20' WIDTH FOR INTERIOR LEVEES) WITH MINIMUM SLOPE OF 1V:3H.
3. VERTICAL DATUM MEAN LOW TIDE = 1.42' BELOW NAVD88 TIDAL EPOCH: 1983-2001

GENERAL REEVALUATION STUDY
TEXAS CITY CHANNEL, TEXAS

TEXAS CITY CHANNEL
BUDM PLACEMENT AREAS
TYPICAL SECTIONS

U.S. ARMY ENGINEER DISTRICT, GALVESTON, TEXAS
DATED: JANUARY 2006

PLATE 11